State, Human and More-Than-Human Transformations in the Politics and Management of Tropical Forest Fires in the Chiquitanía, Bolivia

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KEYWORDS

tropical forest fires, more-than-human political ecology, Indigenous territory, land rights, Chiquitano dry forests

ABSTRACT

Wildfires have become the leading cause of tropical forest loss and will likely intensify as climate change and global demand for agricultural products increase. This is particularly pronounced in the Amazon, where agriculture-driven fires are rising rapidly. Fire-degraded forests diminish access to forest products, leaving Indigenous communities more vulnerable to further environmental change. Although there is burgeoning attention to amplifying the voices of marginalised human communities, the question of how to include Nature's agency in research remains underdeveloped. To contribute to closing this gap, I developed a more-than-human political ecology framework that conceptualises and recognises more-than-human agents beyond their role as resources, drawing on land rights coding and posthumanist assemblage theory. Employing a case study of the devastating 2024 wildfires in Bolivia's Monte Verde Indigenous Territory, and using photovoice, participant observation, and interviews, I investigate issues of land reform, pyropolitics, and incendiary extractivism. My analysis demonstrates how fire's uncontrollable nature is weaponised in land struggles to advance a state-led productive development agenda. Forest loss by fire has resulted in more vulnerable relations between Indigenous peoples and their territory, as traditional fire users face prohibition policies and elevated fire risks. This research reveals that fire's role as a more-than-human agent is central to understanding how land rights are contested on this political frontier.

I. Introduction

> *"...and an interglacial epoch morphs into a distinctive era, a Pyrocene, for which fire is cause, consequence and catalyst".*[1]

In 2024, tropical forest loss reached a global record high, marking an increase of 80% compared to the year before.[2] Unlike in the last 24 years, when conversion to agriculture for the meat industry was the biggest driver, this time it was primarily driven by wildfires.[3] However, most wildfires are in fact a result of intentional fire use to clear land for farming,[4] which means that agriculture is still driving deforestation, though increasingly by means of fire. This is particularly pronounced in the Amazon, where human-caused ignitions, also known as agricultural fires, are rising rapidly[5] and where "fire is not a natural component of the ecological dynamics".[6] Intensifying droughts and ongoing deforestation have already transformed southeastern Amazonian forests from carbon sinks into carbon sources, which physically manifests as a savannah state.[7] Recent models project that these droughts will worsen, driving other disturbances, like large and destructive fires, and thereby creating positive feedback loops as forest vegetation loss limits CO_2 absorption and further accelerates global warming.[8] It is therefore well established that safeguarding the resilience of the Amazon requires reforestation as well as a rapid curbing of greenhouse gas emissions, deforestation and forest degradation.[9] This underscores the pertinence of investigating the anthropogenic dynamics of deforestation by fire, which are subject to debate in scholarly, policy and practical discourse, due to their inherently political nature and implications.[10]

Many mythologies and fire origin stories express how the component and its transformative effects have enraptured cultures worldwide for generations.[11] Under the alarming growth of forest loss from fires, these effects have transcended their reach from local and traditional uses to biome- and state-wide impacts. In parallel, local fire uses maintained by Indigenous or peasant communities, for instance, the prescribed burning of forest patches in mixed swidden cultivation systems for subsistence activities, are increasingly threatened by anti-fire discourses and policies.[12] At the same time, it is recognised that almost half (45%) of the remaining primary forest areas in the Amazon Basin are in Indigenous territories.[13] This

[1] Pyne, Stephen. "Here and There: A Fire Survey." Feral Atlas, University of Arizona Press, 2018, pp. 138-41. Accessed on 24-05-2025.
[2] Global Forest Review. "Fires Drove Record-Breaking Tropical Forest Loss in 2024." (*World Resources Institute*, 21 May 2025).
[3] Ibid.
[4] Arienzo, M. M., et al. "Pre-Columbian Fire Management Linked to Refractory Black Carbon Emissions in the Amazon." *Fire*, vol. 2, no. 2, 2019, p. 31.
[5] Ibid.
[6] MapBiomas. "Area Queimada No Brasil Em 2024 Supera Média Histórica Em 62%." (*MapBiomas Brasil*, 24 June 2024).
[7] Flores, Bernardo M., et al. "Critical Transitions in the Amazon Forest System." *Nature*, vol. 626, no. 7999, 2024, pp. 555-64.
[8] Intergovernmental Panel on Climate Change. "Global Carbon and Other Biogeochemical Cycles and Feedbacks." *Climate Change 2021 – The Physical Science Basis: Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, 2023, pp. 673-816.
[9] Lovejoy, Thomas E., and Carlos Nobre. "Winds of Will: Tipping Change in the Amazon." *Science Advances*, vol. 5, 2019, p. eaba2949.
[10] Essen, Mart, et al. "Improving Wildfire Management Outcomes: Shifting the Paradigm of Wildfire from Simple to Complex Risk." *Journal of Environmental Planning and Management*, vol. 66, no. 5, 2023, pp. 909-27; Miller, Brett A., et al. "Re-Envisioning Wildland Fire Governance: Addressing the Transboundary, Uncertain, and Contested Aspects of Wildfire." *Fire*, vol. 5, no. 2, 2022, p. 49.
[11] Lake, O. O. *The Story Is in Our Bones: How Worldviews and Climate Justice Can Remake a World in Crisis.* New Society Publishers, 2024.
[12] Eloy, Ludivine, et al. "Firing Up: Policy, Politics and Polemics under New and Old Burning Regimes." *The Geographical Journal*, vol. 185, no. 1, 2019, pp. 2-9.
[13] FAO and FILAC. 2021. "Forest governance by indigenous and tribal peoples. An opportunity for climate action in Latin America and the Caribbean." (FAO, 2021). Accessed on 19-06-2025.

poses a tension between the call to secure Indigenous territorial rights as a cornerstone for halting deforestation and the simultaneous erosion of communities' traditional fire practices and ways of life under restrictive policies and hostile discourses. Governing wildfires is inherently complex, with current frameworks, often top-down or technical risk assessment mechanisms, frequently proving ineffective in addressing the transfrontier, unpredictable and contested challenges of megafire management.[14] The contestability of fire governance is typically entrenched in power asymmetries and conflicting interests between actors.[15] Fire-degraded forests tend to diminish the availability of and access to forest products, leaving local communities with shrinking subsistence options, while at the same time, these groups themselves are also users of fire in agriculture, land management, and cultural practice.[16] A recent policy review about wildfires in the Amazon demonstrated the importance of more detailed research and policy on participatory governance for fire use and management.[17] In line with this, several studies emphasise that the participation of local actors directly experiencing the effects of fires enhances sustainable forest management, benefiting both ecological recovery and livelihood sustainability.[18]

In the absence of such participation, fire suppression measures may separate fire management from land use and livelihoods that paradoxically depend on fire.[19] These measures also only tend to achieve short-term results. To illustrate, the fire ban introduced during the burning season in the Brazilian Amazon reduced the number of fires in 2019 but had already become ineffective by the following year.[20] Moreover, empirical studies suggest that state-driven "resilience" policies may hinder the long-term sustainability of rural livelihoods because institutional interventions negatively correlate with the community's capacity to autonomously adapt to or recover from future disturbances.[21] Adding to this complexity, recent research on decolonising wildfire risk management shows how the framing of "climate security" through the criminalisation of small-scale fire users not only unjustly attributes responsibility to those who are frequently least accountable for the escalation in wildfires, reflecting a case of climate coloniality, but also excludes them as active participants in managing increasingly fire-prone environments.[22] Consequently, current fire risk strategies risk perpetuating a historical pattern of externally imposed command-and-control interventions, thereby undermining Indigenous peoples' autonomy in land stewardship.[23] What remains underexplored is how Indigenous fire practices interact with, adapt to, or resist

[14] Essen et al. and Miller et al. (n 10) *supra*.
[15] Armenteras, Dolors, and Francisco de la Barrera. "Landscape Management Is Urgently Needed to Address the Rise of Megafires in South America." *Communications Earth & Environment*, vol. 4, no. 1, 2023, p. 305.
[16] Pereira, Cássia A., et al. "Restoring Fire-Degraded Social Forests via Biocultural Approaches: A Key Strategy to Safeguard the Amazon Legacy." *Restoration Ecology*, vol. 31, no. 8, 2023, e13976.
[17] Eufemia, Luca, et al. 'Fires in the Amazon Region: Quick Policy Review'. *Development Policy Review*, vol. 40, no. 5, 2022, pp. 1-15.
[18] Welch, James R., and Carlos E. A. Coimbra Jr. "Indigenous Fire Ecologies, Restoration, and Territorial Sovereignty in the Brazilian Cerrado: The Case of Two Xavante Reserves." *Land Use Policy,* vol. 104, 2021, p. 104055; Mistry, Jayalaxshmi, and Andrea Berardi. "Bridging Indigenous and Scientific Knowledge." *Science*, vol. 352, no. 6291, 2016, pp. 1274-75.
[19] Armenteras, Dolors, and T. M. González. "Repensando La Gestión de Incendios Forestales En Suramérica: Un Enfoque Integrado En La Era Del Cambio Climático." *Revista de La Academia Colombiana de Ciencias Exactas, Físicas y Naturales*, vol. 48, no. 186, 2024, pp. 210-15; Dube, O. P. "Challenges of Wildland Fire Management in Botswana: Towards a Community Inclusive Fire Management Approach." *Weather and Climate Extremes*, vol. 1, 2013, pp. 26-41.
[20] Machado, Mariana S., et al. "Emergency Policies Are Not Enough to Resolve Amazonia's Fire Crises." *Communications Earth & Environment*, vol. 5, no. 1, 2024, p. 204.
[21] Yang, Xue, et al. "Integrating Rural Livelihood Resilience and Sustainability for Post-Disaster Community Relocation: A Theoretical Framework and Empirical Study." *Natural Hazards*, vol. 116, no. 2, 2023, pp. 1775-1803.
[22] Rodríguez, Iokiñe, et al. "Decolonizing Wildfire Risk Management: Indigenous Responses to Fire Criminalization Policies and Increasingly Flammable Forest Landscapes in Lomerío, Bolivia." *Environmental Science & Policy*, vol. 147, 2023, pp. 103-15.
[23] Ibid.

related governance strategies, and how local actors negotiate their position within increasingly restrictive and punitive frameworks.[24] This study further builds on recent research in the study site,[25] which investigates the persistent neglect of integrating traditional fire knowledge into fire risk strategies and identifies a research gap regarding the regional effects of immigration, noting that "the consequential demographic change will inevitably spread the use of fire into new forest frontiers and influence the politics of knowledge playing out in decision-making".[26] Therefore, it is useful to complement the current state of the art with an appraisal of new settlers and their implications for what Clark calls "pyropolitics," that is, the "collective decision-making over fire".[27] Reasoning that pyropolitics are innately territorial, Cary (2023) suggests that further research is needed on the impact of fire management practices to develop more contextualised understandings of how pyropolitics reconfigure both territory and the modern state.[28]

Through my analysis, I push for moving beyond isolated understandings of environmental change, specifically of forest loss by wildfires, the course of which remains wild, but the cause of which is increasingly human. While both climate change and the burning forest could be studied in simple single-issue terms, it requires a concern for the ties the global economy sustains with these phenomena to inspire structural socio-ecological transformation.[29] However, the fact that the issues are linked to the global economic, and ultimately capitalist, system, renders the situation "both more pervasive and, paradoxically, more amenable to treatment" since it is partly in our hands.[30] To analyse both fires caused by climate change and agriculture, I adopt a political ecology approach, which conceptualises environmental issues as essentially political phenomena embedded in economic and social relations.[31] Moreover, this field aims to elucidate how localised environmental changes are influenced by both historical and contemporary regulatory frameworks and market dynamics.[32] Yet, political ecology has tended to centre human actors, often overlooking how non-human actors, such as the climate or wildfires, actively shape socio-political dynamics.[33] The question of how to address the rising recommendations in the literature for including and examining Nature's agency, voice, or stake in research is still underdeveloped, which poses a major methodological challenge, "despite the growing recognition and theoretical arguments for including the inter-subjectivities of more-than-human participants in conservation".[34] More-than-human political ecology examines the entanglement of human and non-human actors, which I use to trace how they jointly constitute both the conditions and the consequences of megafires. Attending to fire as an actor in its own right, rather than as a mere outcome of human activity, makes it possible to become attentive to how forests and fires dynamically interact with regulatory

[24] Ibid.
[25] Devisscher, Tahia, et al. "Deliberation for Wildfire Risk Management: Addressing Conflicting Views in the Chiquitania, Bolivia." *The Geographical Journal*, vol. 185, no. 1, 2019, pp. 38-54.
[26] Ibid at p. 51.
[27] Clark, Nigel. "Pyropolitics for a Planet of Fire." *Territory beyond Terra*, edited by Kimberly Peters et al., Rowman & Littlefield, 2018, p. 74.
[28] Cary, Michael M. "Pyropolitics and the Production of Territory." *Environment and Society*, vol. 14, no. 1, 2023, pp. 104-21.
[29] Chung, Y. B. "Historicising Sustainable Livestock Intensification and Animal Genetic Improvement in Africa: Towards a Decolonial Multispecies Climate Justice." *The Journal of Peasant Studies*, vol. 0, no. 0, 2023, pp. 1-21; Fraser, Nancy. "Climates of Capital: For a Trans-Environmental Eco-Socialism." *New Left Review*, vol. 127, Jan./Feb. 2021, p. 34.
[30] Pyne (n 1) *supra* at 141.
[31] Benjaminsen, Tor A., and Hanne Svarstad. "Political Ecology." *Encyclopedia of Ecology*, Elsevier, 2019, pp. 391-96.
[32] Ibid.
[33] Fischer, Klara, et al. "The Political Ecology of Crops: From Seed to State and Capital." *Geoforum*, vol. 130, 2022, pp. 92-95; Fletcher, Robert, and Jack Busher. *Convivial Conservation: A Critique of Conservation Policy and Practice*. Routledge, 2020.
[34] Fletcher, Robert, and Jack Busher. *Convivial Conservation: A Critique of Conservation Policy and Practice*. Routledge, 2020, p. 232.

frameworks, economic pressures, and local practices.

In sum, I identified several research gaps in the literature review, regarding (1) local responses and their position in relation to authorities, (2) the implications of immigration on pyropolitics, and (3) a methodological exploration of more-than-human agency. Taking these into account, I set out to understand how forest fires *produce* and *are produced by* the relations between state, human, and non-human actors. In other words, I aspire to investigate how intensifying forest fires are both driver and outcome of land rights reconfigurations. The research is therefore directed at enriching and validating the field of more-than-human political ecology. By expanding upon the theories of regimes of dispossession by Lund (2024)[35] and conceptually constructing Nature as a political subject, I demonstrate the significance of political ecology analysis rooted in more-than-human relationality, which may be more harmonious with non-hegemonic Indigenous epistemologies and territorial governance of the Global South.

II. Conceptual Framework

In this section, I present my conceptual framework, first by discussing contemporary common ways of understanding land rulemaking and ownership. While offering useful ways to analyse why and how humans are excluded from assets, Nature is only conceptualised as an asset and not an agent in itself, which is why I propose a conceptual integration of these theories with more-than-human political ecology and assemblage theory.

A. Processes of (Dis)possession and Territorial Control

When studying land struggles, in this case related to forest fires, possession and dispossession are key elements to reckon with. One way of looking at land (dis)possession that allows us to better apprehend its complexity is through the work of Lund, which argues that the ability to grant or deny rights to resources and community membership constitutes state[36] power and that recognition is a reciprocal process through which effective rights establish authority, and vice versa. This dynamic can be illustrated by examining how the "coding" and "recoding" of assets, the identity of rights-holders, and public authorities contribute to the ongoing formation of governance. Processes of (dis)possession are often characterized by the complex interplay of legal and institutional pluralism.[37] An asset is defined as “something of value and the codes that specify its valences",[38] a rights subject is defined as "a natural or artificial person *and* the codes determining its specific entitlements",[39] and a public authority as “an institution *and* the codes determining its jurisdiction".[40]

Codes are instrumental to each of the three components – codes themselves are construed as "a script that tells us the nature of the asset, how it appears to the social world, how it can be held, used, and transacted, as well as how it falls within different jurisdictions of regulation".[41] While coding establishes a rule, it is through legalisation that such a rule acquires the force and social recognition of law; the quality of law is not an inherent property of a rule but a status attributed to it through ongoing socio-political exchange. The very nature of property is redefined through these acts of coding, which can be used to either entrench or challenge existing claims, often resulting in the consolidation of power and rights for some, at the expense of others.[42] For my case study, and in line with Lund, I

[35] Lund, Christian. “Coding Regimes of Possession. An Essay on Land, Property, and Law.” *Globalizations*, Apr. 2024, pp. 1–16.
[36] Per Lund (2016), the state is not one unit but several institutions and “always in the making” (p. 1200).
[37] This refers to a context “where multiple legal and political systems coexist and intersect” (Lund, 2024, p. 4).
[38] Ibid at p. 4.
[39] Ibid at p. 4.
[40] Ibid at p. 4.
[41] Ibid at p. 2.
[42] Ibid at p. 6.

understand authorities as comprising both the formal state, state-like institutions, including the INRA[43] and ABT,[44] and local organisations, like the Indigenous councils. Hence, I focus on the convergence of governments at three levels and the two state authorities ABT and INRA. According to Cary, the control and management of fire is closely tied to the concept of territory, with authorities attempting to shape fire regimes through the delimitation of political boundaries and the territorial control of peoples and resources.[45] The entitlements of rights-subjects are negotiated by boundary-drawing institutions and their jurisdiction (public authority) through the making and maintaining of territories.

In the study area, there are designated zones for both natural and artificial persons, the latter denoting the forestry concessions. Indigenous territories in particular often remain one of the last barriers between conservation and deforestation in the frontier, where Nature is cleared to develop more assets.[46] Yet scholarly traditions typically fail to understand the impacts and responses of Nature in a non-anthropogenic way, and interventions to solve issues of hybrid nature, i.e. involving both biophysical and socio-political factors, as is the case with anthropogenic wildfires, often rely on working with non-human agents.[47] I aim to address this by incorporating land (dis)possession and socio-natural assemblage theories.

B. More-than-human Agents, Assemblages and Transformations

While the theories discussed above are useful in understanding the human dimensions of (dis)possession and territorial control, questions arise about the role of non-human actors, who also participate in the dynamic cause-and-effect process shaping social and hybrid phenomena like land struggles. Therefore, the theoretical framework presented here adds more-than-human agency as a fourth component to the three components of asset, rights subject and authority (**Figure 1**). Combining analytical frameworks of how processes of possession are produced[48] and assemblage thinking, where no one element "has sufficient competence to determine consistently the trajectory or impact of the group",[49] I understand these components as interacting in a multidimensional manner (see **Figure 1**), that is, a reconfiguration of one component and relations among those are always co-constituted. The reconfiguration of the more-than-human agent component launches material, emotional and relational ripple effects on the rights-holders whose lives are connected to it, for instance.

While it may be argued that biotic and even abiotic non-human actors behave with purpose,[50] according to Guthman, "the implied agency of nonhumans is intended to connote not intentionality, but rather an object's capacity to produce an effect on another object".[51] A megafire features significant agentic capacity: it may recode assets by destroying them, reconfigure rights-subjects by displacement and challenge authorities by exposing institutional neglect or failure. Whereas assets comprise the access to the benefits of a (natural) resource,[52] it is overlooked how non-human, and even non-animate entities or forces, also shape coding and recoding, and ultimately (dis)possession.

[43] National Institute of Agrarian Reform. The state authority responsible for land titling, redistribution, and regulation of property rights, including recognition of Indigenous territories.
[44] Forest and Land Authority. Responsible for regulating, authorising, and monitoring forest use, land clearing, and timber trade within national legal frameworks.
[45] Cary (n 28) *supra*.
[46] Nepstad, Daniel, et al. "Inhibition of Amazon Deforestation and Fire by Parks and Indigenous Lands." *Conservation Biology*, vol. 20, no. 1, 2006, pp. 65-73.
[47] Guthman, Julie. *Wilted: Pathogens, chemicals, and the fragile future of the strawberry industry. Vol. 6*. University of California Press, 2019. p. 17.
[48] Lund (n 36) *supra*.
[49] Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Duke University Press, 2020, pp. 23-24.
[50] Mitchell, Timothy. "Can the mosquito speak?." *Rule of experts: Egypt, techno-politics, modernity*, 2002, pp. 19-53.
[51] Guthman (n 45) *supra* at p. 17.
[52] That is, according to Lund (n 36) *supra*.

It would not suffice to include Nature as a mere resource or asset, as it falls short of accounting for the agency that still exists outside of its utilised, exploited or otherwise economically relevant form. Whereas assets comprise things valuable to humans, including Nature, more-than-human agents point to the environmental forces of and beyond natural resources. Natural agents continually shape and are shaped by rights-holders and authorities, yet assets, including Nature, are also shaped by Nature itself. Therefore, Nature does not merely make up a pre-existing external condition of, e.g., land reforms, and must be included as a constituent component of regimes of (dis)possession.

The idea behind my inclusion of natural actors is rooted in the term more-than-human, which understands non-humans, such as flora and fauna, and non-living beings, such as fire, as important social actors, moving beyond anthropocentric understandings of environmental change.[53] Scholars like Julie Guthman,[54] Anna Tsing[55] and Klara Fisher[56] acknowledge the active part non-humans play in producing phenomena and results, where agency is implied by its consequentiality, that is, the capacity to generate effects on other objects and subjects. Applying an analytical lens as such is also known as assemblage thinking, which refers to a constellation of diverse and dynamic processes that, in conjunction, create significant and transformative effects. The assemblage studied here is the joint expression of the four components: assets, rightsholders, authorities and the more-than-human, with the latter concentrated on fire and forests.

When referring to the term transformation throughout this thesis, I draw on the definition from IPBES' Transformative Change Assessment report, which defines it as "fundamental, system-wide shifts in views, structures and practices".[57] In the description of the conceptual diagram above, I touch on two related types of transformations, which should both be analysed not as spatially or temporally linear processes but as cross-scale, retroactive and transboundary trajectories, evocative of the climatic feedback loops discussed in the introduction. By transformation of land rights, I mean the modification of legal frameworks, regulatory measures, or traditional practices related to land ownership, utilisation, and transfer. By transformations in the assemblages, I refer to changes in perceptions, relations and practices taking place in the more-than-human world with which local communities interact.

C. Human and Non-human Agency

The main theoretical argument for considering the more-than-human may be that at the core of the unfolding socio-environmental crises, including the climate and fire crisis, lies the Western worldview that detaches humans from non-humans. Western scientific thinking of nature in materialistic and mechanical terms, devoid of agency and sentience,[58] exempts our moral responsibility towards it, since we are exploiting things rather than sentient beings.[59] That way, "science serves capitalism very well by making the exploitation of nature morally acceptable".[60] Extending political ecology with a more-than-human lens explicitly counteracts this by addressing non-human entities as actors in the co-production

[53] Ballamingie, Patricia, and David Szanto. *Showing Theory to Know Theory*. Showing Theory Press, 2022, pp. 283-89.
[54] Guthman (n 45) *supra*.
[55] Tsing, Anna Lowenhaupt. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton University Press, 2015.
[56] Fisher, Klara, et al. "Broadening Environmental Governance Ontologies to Enhance Ecosystem-Based Management in Aotearoa New Zealand." *Maritime Studies*, vol. 21, no. 4, 2022, pp. 609-29.
[57] IPBES. "Summary for Policymakers of the Thematic Assessment Report on the Underlying Causes of Biodiversity Loss and the Determinants of Transformative Change and Options for Achieving the 2050 Vision for Biodiversity." Edited by Karen O'Brien et al., (*IPBES Secretariat*, 22 Jan. 2024).
[58] Riskin, Jessica. *The Restless Clock: A History of the Centuries-Long Argument over What Makes Living Things Tick*. University of Chicago Press, 2016, p. 337.
[59] Milton, Kay. *Loving Nature: Towards an Ecology of Emotion*. Routledge, 2003, p. 53.
[60] Ibid.

of shared worlds.[61] I define more-than-human agents as animate and inanimate natural matter, to comprise both the living forest and fire as an element, borrowing from new materialists like Jane Bennet (2020)[62] who ascribe the capacity of matter "not only to impede or block the will and designs of humans but also to act as quasi agents or forces with trajectories, propensities, or tendencies of their own". Non-human agents operate within contexts shaped by social structures, indeed, increasingly so, and their actions in turn reshape those structures, which can be nothing short of transformative. It would thus be an ontological mistake to exclude these agents from our analytical lens since they often directly or indirectly have bearing on social structure, which is conceptualised in relation to agency by Archer (2003).[63] To understand *human* agency vis-à-vis environmental changes, we must regard both the material and the emotional relations to Nature; this relation shapes how people act and adapt.[64]

Collectively, the framework proposes a theory of human and non-human (dis)possession in which assets, rights-subjects, authorities, and more-than-human agents continuously code and recode each other, producing transformations in land (rights) and more-than-human assemblages. In the field, this translates into observing how forest fires disrupt existing configurations of access and authority as well as catalyse new assemblages, by collecting data on the roles of both state, human and non-human agents in the making and management of deforestation by fire. Since these cannot be objectively measured or quantified, I draw mostly on qualitative data, as set out below.

III. Methodology

A. Case Study and Justification

1. Of What is This a Case?

The Amazon biome has recently experienced record-breaking wildfires, indicative of a "new fire regime" where climate change, El Niño, and land degradation intensify blazes.[65] This has prompted calls for fire suppression across South America, particularly in Amazonian woodlands with long, complex burning histories now facing catastrophic fires.[66] While there is a shift towards "new fire management," it remains contentious, relying on technology, legislation, and governance models that seek to transform, rather than integrate, traditional practices.[67] These dynamics fuel regional tensions in Latin America, where environmental policies and development initiatives clash with local livelihoods, often perpetuated by "primitivist" views that demonise traditional land uses.[68] Powerful agribusiness further leverages anti-fire narratives to undermine Indigenous and traditional land rights, despite their own significant contribution to deforestation and thus fire risk.[69] Moreover, climate change politics frequently conflate large-scale agro-industrial clearing with smallholder practices, unfairly targeting adaptive traditional systems.[70] The reliance of Latin American fire policies on geospatial technologies often marginalises local knowledge and decision-making power, leading to new forms of expropriation.[71] As such, colonial tropes about "the undeveloped" underpin a narrative about human-environment interactions that fosters

[61] Fisher (n 53) *supra*.
[62] Bennet (n 43) *supra*.
[63] Archer, Margaret S. Structure, Agency and the Internal Conversation. Cambridge University Press, 2003.
[64] Mortensen, Sofie, and Francois Questiaux. "Extending the Ethnographic Toolbox: Photovoice and Everyday Experiences of Marginalised Groups." *Gender, Place & Culture*, 2024, pp. 1-26.
[65] Eloy et al. (n 12) *supra*.
[66] Ibid.
[67] Carmenta, Rachel, et al. 'Forbidden Fire: Does Criminalising Fire Hinder Conservation Efforts in Swidden Landscapes of the Brazilian Amazon?' *The Geographical Journal*, vol. 185, no. 1, 2019, pp. 23–37.
[68] Oliveira, Gustavo, and Susanna B. Hecht. Soy, *Globalization and Environmental Politics in Latin America*. Routledge, 2018; Eloy, Ludivine, et al. "On the Margins of Soy Farms: Traditional Populations and Selective Environmental Policies in the Brazilian Cerrado." *The Journal of Peasant Studies*, vol. 43, 2016, pp. 494-516.
[69] Ibid.
[70] Padoch, Christine, and Miguel Pinedo-Vasquez. "Saving Slash-and-Burn to Save Biodiversity." *Biotropica*, vol. 42, 2010, pp. 550-52.
[71] Carmenta, Rachel, et al. "Shifting Cultivation and Fire Policy: Insights from the Brazilian Amazon." *Human Ecology*, vol. 41, 2013, pp. 603-14.

policies and interventions that tend to dispossess local smallholders.

In this context, Indigenous Chiquitanía[72] territories, located in the midst of last year's megafires and acting as important retainers of agricultural frontier expansion in Bolivia, emerge as a critical space to analyse tensions between fire use, forest management and Indigenous land rights. Bolivia's forests were especially devastated in the 2024 dry season, with a 200% increase in primary forest loss, affecting at least 31 Indigenous territories, 36 protected areas, and 10% of the country's surface,[73] including the Amazon rainforest and the world's largest remaining dry forests: the Chiquitano and Gran Chaco. Data from the National Institute for Space Research (INPE) indicate that the Chiquitanía, in particular, has suffered extensive burning that devastated thousands of hectares of forest, affecting biodiversity and the livelihoods of local communities.[74] Among the hardest hit was the Indigenous territory of Monte Verde, where the Chiquitano dry forests meet the humid Amazon, and over 80% of the land was ravaged by megafires. Hence, this study's geographical focus is well-suited as a case of deforestation due to fire, environmental control and land rights struggles, as well as the relational, ecological, economic and political mechanisms through which these occur.

B. Case Background

Relevant details regarding the study site are given to situate the analysis, including vegetation types, land cover changes, territorial legal recognition, and the cultural history. The Monte Verde Indigenous Peasant Territory is located in the department of Santa Cruz and was titled with an area of 974,447 hectares in 2007 in favour of the Chiquitano Indigenous people who have ancestrally inhabited it. The territory is part of the Chiquitanía, one of the eco-regions in the eastern lowlands of Bolivia,[75] which falls under the municipal jurisdiction of four municipalities: Concepción, San Javier, Urubichá and Ascensión de Guarayos.[76]

1. Biophysical Characteristics

The largest natural vegetation cover is forest, occupying approximately 80.8% of the surface area. The remainder comprises the southern and southeastern portions, where the rural and savannah physiognomies stand out, as distinguished by **Figure 2**.[77] However, by the end of 2020, the natural land cover within the study area had suffered a loss equivalent to 7.3% of its extension, transformed into agricultural and/or livestock production areas, or new human settlements.[78] The Indigenous community that participated in this study, anonymised as community A, resides in a transitional forest where the humid Amazonian species meet the more fire-adapted dry forest.

2. Land Rights and Disturbances

The physical and political boundaries of the Indigenous territory are delineated in **Figure 3**, with cut-out shapes indicating third-party appropriators alongside pre-existing private properties owned by Mennonites.[79] The struggle for recognition and titling of this

[72] A geographical and cultural region and the name of the world's largest tropical dry forest ecosystem found in that region.

[73] He, Yin, et al. "Enact Reforms to Protect Bolivia's Forests from Fire." *Science*, vol. 387, no. 6731, 2025, p. 255.

[74] Instituto Nacional de Pesquisas Espaciais (INPE). Monitoring of Fire Hotspots in the Brazilian Amazon. (TerraBrasilis, accessed on 16-04-2025).

[75] Tamburini, Lorenzo. "Atlas Sociopolítico Sobre Los Territorios Indígenas En Las Tierras Bajas de Bolivia." (*CEJIS*, Jan. 2019).

[76] Pinto, M. "Estado de Arte Del TI Monte Verde Con Base En Procesos de Planificación, Ordenamiento Territorial y Uso Del Suelo Para La Elaboración de Su Plan de Vida." APCOB, 2022, p. 60.

[77] APCOB. "Evaluación de Daños en el Bosque a Causa de los Incendios Forestales [Forest Damage Assessment Due to Forest Fires]." (*APCOB*, 2024). Accessed on 05-05-2025.

[78] Ibid.

[79] Mennonites are traditionalist Christian communities known for their agrarian lifestyle and cultural separation

Indigenous territory began in 1997 and has since then been a long and complex process, culminating in Executive Title No. TI-NAL-000148 in 2007, which recognises 947,440.8320 hectares as the ancestral territory of the Chiquitano Indigenous people.[80] According to INRA, Law No. 1715 establishes the territory as collective property, unseizable, indivisible, imprescriptible, and inalienable. Bolivia's Constitution (Art. 403, I) recognises Indigenous and peasant territorial integrity, granting rights to land, renewable and non-renewable resource use, prior consultation, self-regulation, autonomous administration, and culturally grounded development in harmony with Nature. The Executive Title establishes the Chiquitano Indigenous people, organised into 128 communities and affiliated with three Indigenous organisations in the Ñuflo de Chávez province, as legitimate owners. Monte Verde spans three municipalities, governed by three corresponding Indigenous community councils: CICC (Concepción), CIP-SJ (San Javier), and CICOL (Lomerío). Communities elect representatives to their respective councils, which possess executive and administrative authority over the territory.[81] However, pressure from economic interests and insufficient protection have left the territory vulnerable to extractive activities and environmental degradation. In 2024, nearly 700,000 hectares were burned, of which 500,000 ha were high forest and 176,000 ha were managed timber areas.[82]
In addition to collecting both timber and non-timber forest products, the Chiquitano Indigenous communities also rely on the forest for hunting. Furthermore, the forest holds significant cultural and spiritual value for the Chiquitano people.[83]

C. Data Collection and Methods
This case study employed a community-based participatory research (CBPR) approach, combining quantitative impact analysis, semi-structured interviews, participant observation including more-than-human ethnography and photovoice.[84] The following will outline a more detailed description of how each method was designed and deployed in the field.

1. Quantitative Socio-economic Impact Analysis
An essential component involved collaboration with APCOB,[85] a civil society organisation supporting Indigenous groups in eastern Bolivia. This partnership began with two weeks at their Concepción office, systematising, analysing, and writing a report on socio-economic impact data from affected communities, as a reciprocal agreement compensating APCOB for facilitating access. The extensive dataset documented fire-induced damages and costs from 2024. Using Stata, I conducted descriptive statistical analyses to quantify total costs across categories (health, evacuation, firefighting, agriculture, livestock, and infrastructure). The analysis surveyed 16 of 86 communities and not all losses could be expressed in monetary values, including exact timber, non-timber, restoration, and apiculture costs, so reported numbers represent a sample of the actual costs.

2. Semi-structured interviews
Sixteen semi-structured interviews, averaging 70 minutes, were conducted using tailored guides for each stakeholder group, while maintaining consistent thematic threads for cross-comparison. At the local level, purposive sampling targeted long-term residents in community A, two leaders of intercultural communities and their women's

from modern society. Their colonies have become significant drivers of deforestation across Latin America through large-scale agricultural expansion (see Le Polain de Waroux et al., 2020).
[80] APCOB. "DIAGNÓSTICO INTEGRAL DEL TERRITORIO INDIGENA DE MONTE VERDE [COMPREHENSIVE DIAGNOSIS OF THE INDIGENOUS TERRITORY OF MONTE VERDE]." (*APCOB,* 2023). Accessed on 05-05-2025.
[81] Pinto (n 74) *supra*.
[82] Ibid.
[83] APCOB (n 78) *supra*.
[84] For details on the latter two methods (participant observation and photovoice), see my full thesis.
[85] APCOB stands for "Support for the Peasant-Indigenous People of Eastern Bolivia" (in Spanish: "Apoyo Para el Campesino-Indígena del Oriente Boliviano").

organisation[86] and the cacique.[87] For the latter, questions were supplemented with broader context inquiries adapted from Natarajan et al. (2022).[88] Community A has 18 families and 67 inhabitants; at the time, half the families were present, not always permanently. Given the small sample, sequential interviewing was used until saturation. Municipal and regional participants were selected based on influential roles in the fire crisis and land struggles. After interviewing municipal managers, a third local community group—peasant community farmers[89] of the organisation "El Única"—was encountered and interviewed due to their distinct land history. An overview of participants by method and category is in **Table 1**. Each interview followed a standardised protocol with positionality disclosure and formal consent. Three thematic sections structured the dialogue: human/non-human fire-mediated relationships; power networks; and forest governance and risk management approaches.

D. Ethical Considerations and Methodological Reflexivity

Issues of tropical forest fires, access, degradation, conservation, and restoration are sensitive, and there was a risk of accidental findings. Confidentiality was protected by anonymising the community as “community A” and removing all identifiers. Informed consent was systematically documented following the International Society for Ecological Restoration guidelines. Colonial legacies required reflexivity on positionality, acknowledging privileges and biases, and practising cultural sensitivity. Household interviewees were reimbursed for their time with edible pantry staples not available for purchase or production in the territory.

E. Data Analysis

Data analysis employed qualitative thematic analysis using NVIVO software. Interview transcripts, photovoice descriptions and participant observation notes were systematically and inductively coded, then organised into broader thematic categories through iterative comparison and refinement. The resulting coding tree featured parent codes of fire impacts, local risk management, adaptation and agency, land tenure and structural drivers. Data was organised across three analytical levels:

1. local (household interviews: ll-hi; photovoice: ll-pv; participant observation: ll-po);
2. municipal (stakeholder interviews: ml-g, ml-cr, ml-uf, ml-ic, ml-f, ml-abt);
3. regional (stakeholder interviews: rl-g, rl-sf, rl-inra; quantitative report: rl-rep)

IV. Results: Fire Control, Land Struggle and Governance

What follows is an overview of the research findings on the institutional, political and policy landscape that surrounds and substantiates forest fires. First, perspectives on disaster response, fire emergence, and forestry are revealed, followed by a review of land trafficking, law enforcement and the politics of fire governance.

A. Disaster Response and Risk Strategy

The 2024 fires sparked both immediate disaster response and delayed policy changes. The total economic expenditure across all categories is estimated at Bs[90] 16.72 million (€2.07 million), summing only losses or direct expenditures by the communities (excluding donations and unquantified damages). Of this,

[86] These are communities consisting of both local *canbas* (Indigenous people from the East) and immigrant *collas* (Indigenous Peoples from the West). Both women's communities are located near TI Monte Verde.
[87] Indigenous community chief.
[88] Natarajan, N., et al. “A Sustainable Livelihoods Framework for the 21st Century.” *World Development*, vol. 155, 2022, p. 105898.
[89] Peasants belonging to a national labour union, whose land was granted during the 1922 revolution, when whoever managed the land became the owner, that is, INRA recognises their legal ownership.
[90] Bolivian boliviano, the currency of Bolivia.

more than half, Bs 9,8 million (€1.22 million) was spent on firefighting. This section presents findings related to firefighting and the right to use fire, enveloped in so-called burning calendars.

1. Firefighting

When fire reached the coffee agroforestry systems in Community A, the community created a fire barricade around the chaco.[91] Next to fire management, they physically put their bodies on the line. Fire control is generally arduous because it moves in two dimensions – horizontally and vertically – at the same time (ll-po). Community firefighters would return to the village unwell, carrying backpacks with twenty litres of water, which meant a great weight and responsibility. They saved some of their surroundings. Military help arrived, but only worked during the day, while community firefighters worked at night to avoid the smoke and to prevent fire from catching up (ll-hi). The nighttime was also preferred by the peasant farmers, who moreover reported not having received any aid during those months, as coordination was abysmal and volunteer firefighters never arrived (ml-uf). Therefore, they had to organise their own firefighting teams, much like the efforts by cattle ranchers who brought in two volunteer brigades for private producers, since “the volunteer firefighters were only sent to communities" and "the state firefighters just came to take photos and leave" (ml-cr). Similar signs of frustration over the shortcomings of state-led help are indicated by the commentaries of Indigenous community firefighters, who were worried about soldiers getting lost because of not knowing the terrain (ll-hi).

Meanwhile, women feared for their husbands away fighting fire every night for two months: "it was eight o’clock in the morning, I could not see anything and wanted to cry" (ll-hi). Despite their efforts, the fire just would not get extinguished for a long time: "we woke up covered in ashes". When the dry season starts again, the communities will begin reorganising, and there will be firefighter meetings. External support may be needed for the local firefighting crews, in terms of training, technology to monitor fires, and water wells (ll-po). Leaders of the peasant farmer union reported that their community, along with three neighbouring communities, had not received any formal fire-safety training or other external assistance, and voiced a strong appeal to greater independence regarding risk response: “We demand live satellite monitoring during burning seasons. ABT lacks the technology. Alerts from Santa Cruz's satellite arrive days later. Besides, the imagery is inaccurate: my deforestation permit was denied because fire scars appeared on the map” (ml-uf).

The municipality also argues that communities should be able to act autonomously, and so, promoted the formation and preparation of communal firefighting teams with tools, equipment and techniques for forest fire control (ml-g). However, bureaucracy becomes both a precondition and a bottleneck in the process of obtaining the necessary resources: “Imagine we receive a call about a fire requiring the municipal crew. By the time we arrive, delayed by preparation and paperwork for financial resources—four or five hours later—everything will be ashes” (ml-g). Under the national risk management Law 602, municipalities must respond first when fires occur. Only after exhausting all local resources does the department intervene. Resources were soon stretched throughout the municipality, but to comply with Law 602, it is required to prove limited resources through extensive documentation, such as reports of fire damage data. The bureaucratic hurdles represented a serious struggle: “imagine having to collect data while the fire is burning everywhere" (ml-g) and may explain why one respondent reflects that during this critical period, "the mayor’s office wakes up three weeks late" (ml-f). The mayor cannot declare a disaster without first going through the municipal council, the executive branch or the legislative branch; by then, funds may be gone. After declaring a disaster due to drought

[91] Slash-and-burn (agroforestry) farming plot.

since June, the municipality was finally able to declare a disaster due to forest fires through a decree promoted by the mayor on August 8th. Until then, there was a severe lack of financial and human resources, while the fires started much earlier, at the start of July (ml-g).

The representative of the INRA describes a time-consuming multi-step bureaucratic chain, including tenure status verification of affected areas, that delayed response (rl-inra). The departmental agency claims that the national government refuses to support bottom-up firefighting efforts as a way to keep them constrained, using a lack of training as an excuse. However, training cannot be requested since Santa Cruz is not politically allied to the current administration (rl-g). Withholding resources and coordination from non-allied departments clearly shows how firefighting is politicised. When the brigades eventually arrived, an extra burden emerged from the military's inexperience in firefighting and the chaos caused by deficient logistics, fuel and food, which had to be provided by the already resource-poor municipality (ml-g). Overall, government help has been incompetent during the disaster, reinforcing a growing tension between local communities and the governor's office. The state also prescribes the time and place at which people are allowed to use fire, which has seen recent reforms in terms of policies on controlled burning calendars and the ecological pause.

2. Fire Use Criminalisation

> *"Without burning, we won't be able to sustain ourselves; we live off it" (ll-hi)*

On September 24th, 2024, the national government approved an environmental pause (*pausa ambiental*) by bi-ministerial Supreme Decree 952252. Among its main provisions, it suspended all burning authorisations previously issued by the ABT and prohibited the issuance of new ones. According to the ABT, calendarization prohibits burning in the municipality of Concepción from June 15 (2025) onward. This burning calendar has reportedly been designed following provincial meetings with governments, rancher-logger associations, and communities to integrate their burning knowledge, while also using meteorological forecasting data (ml-abt). Illegal burning is said to be kept in check by technical teams that verify heat points on-site. The National Geospatial Monitoring Unit shares reports and if evidence confirms illegal burning, the ABT issues a citation and initiates administrative sanctions and legal processes (ml-abt). Differential sector-specific and area-based fines are established in the implementing regulations, with communities paying Bs 1500-2500 less per hectare than private properties.

The regional government implemented a sectorised and controlled burning calendar, too, though municipal officials argue this still enables agribusiness to burn at will with a burning order (ml-g). Moreover, many private producers prefer to pay the fine rather than to comply with the ban (rl-g), indicating a discriminatory incentive structure. The fines disproportionately target those who operate on smaller scales using slash-and-burn agriculture. To add, clearing land without burning is not prohibited, allowing continued deforestation, which incidentally leaves flammable material that can catch fire. While the environmental pause remains in force nationwide, the municipality created local legislation to accommodate subsistence farmers who depend on burning (ml-g). To this end, communities are already presenting their burning calendars and contingency plans for slash-and-burn farming, per municipal officials (ml-g). Although the private cattle rancher representative asserts that communities should also uphold burning before the dry season, this is already the case in Community A and involves significant alterations to the farming season. Where Indigenous communities used to burn throughout the dry season, from June to September, they now only have the right to burn from November to December (ll-hi). Indigenous, intercultural and peasant farmers alike affirmed they wait to start with

controlled burning until after the first rains, traditional burning knowledge that does not seem to find its reflection in the burning calendars imposed by the authorities discussed above.

The cacique encapsulated the sentiment sharply, saying, "They can tell us we cannot burn, but what are we going to eat?" (ll-hi). Overall, the Indigenous community members accept the ban, or "will have to accept the situation as is," as one elder put it, although compliance is not controlled, and despite feeling it is unjust (ll-hi). Some are unsure how to manage the chaco now; others are shifting to cutting with a machete or mechanical power, in spite of the additional workload (ll-po). Peasant farmers argue that communities must organise burning seasons collectively and will continue fire use, in coordination with authorities (ml-uf). While they might have more capacity for compromises than the Indigenous farmers, considering livelihood differences, they also worry: "This year our people will not have enough to eat" (ml-uf). Indeed, the majority of Indigenous and peasant communities rely on burning to prepare their lands and grow crops. Now that burns are prohibited without offering real alternatives - like supplies, machinery, or accessible credit - how does the state propose these families produce food without resorting to fire-based practices? In response, the regional government of Santa Cruz points out that communities use gasoline-powered tools, oxen, or horses instead of machinery, and keep poultry for income. In some areas, primarily new settlements, machinery has been introduced. Beyond that, Santa Cruz appoints the national government responsible for budget constraints: "We recognise the need to provide more support, but available resources are insufficient – this depends entirely on state funding" (rl-g).

B. Land Rights and Reform

The process of reallocating private to fiscal land and, subsequently, intercultural settlement establishment, represents a set of complex and politically charged land titling interventions. First, the debate around fire culpability is explored to introduce the positions of and relations between the communities and authorities on the policy-making and receiving end, after which insights into the East/West divide and the role of immigrants are put forward.

1. Fire origin stories and sectoral responsibility

Stakeholders operating in the fire-affected area around Concepción often hold opposing and contradictory views on vulnerability and responsibility in relation to the causes, effects and disaster relief of 2024's burning events. A local government official in the risk management unit evaluates:

The most affected will always be the Indigenous sector because they harvest from the forest's non-timber products, which are burning now. Now, the big ranchers won't be as affected because they cultivate extensive croplands. Apart from that, they have the machinery and mobility to alleviate losses and can access aid opportunities. The Indigenous sector does not have that, so what will they do? (ml-g)

However, peasant farmers counter that although their papaya fields and pastures burned and the cattle nearly died too, they "received no help while Indigenous communities got tons of aid" (ml-uf). The cattle rancher representative also claimed a lack of support, challenging the above claim that forest-based communities are hardest hit—pasture burns first, and 90% of association members lost pastures, forcing them to buy hay (ml-cr). Yet, a forest engineer and timber merchant posited that loggers are the real victims as they paid for permits and machinery: "If fire consumes standing trees, the loss is ecological, not financial. But if it burns harvested wood, the logger absorbs the blow. That's the irony: the ones following the rules shoulder the risk" (ml-f). The fact that all groups of rightsholders involved position themselves as victims points to the possibility of instrumentalised victimisation to avoid

accountability and claim rights to disaster relief.

Interviewees inside the territory consistently conveyed that their controlled burns never extended into the forest and that the fires came from Concepción or Guarayos. Discrepancies arose around the culprit, ranging from anthropogenic origin unknown (ll-hi), to private cattle ranchers, to intercultural communities who "sometimes start fires intentionally to move Indigenous people off their lands" (ll-po). Overall, it seems like most members of the community think that the private properties do not control fire, including the cacique, who also appeals to geoinformation (ll-hi):

With remote sensing and satellite imagery, it is no longer possible to blame the Indigenous communities for starting agricultural fires; they are third parties, mainly ranchers. The government sets rules for us, which we abide by, but not for business owners.

Nonetheless, it seems the authorities managing such data keep it under wraps, reflected by peasant farmers expressing frustration over "officials whitewashing the truth" and demanding an investigation into ignition points (ml-uf), and an Indigenous participant stating: "Nobody is speaking about this, not even the authorities. There is no justice." (ll-hi).

The head of the regional ABT attributed outbreaks to intercultural communities burning illegally during prohibited months, noting that migrants from inland Bolivia ignited fires due to a lack of awareness, while some private properties lost control due to wind. No incidents were recorded in ABT-authorised areas with approved burn plans, per the ABT (ml-abt). INRA provided a more concrete account: according to published reports, 29% of burn scars were on private properties (primarily cattle ranchers burning pasture), 25% on TIs, and 29% on unavailable forest land such as protected areas, where fires sometimes conceal illegal logging and timber trafficking by private entrepreneurs (rl-inra).

The government of Santa Cruz stresses that since large producers conduct mechanised clearing, in most cases, it is small producers responsible for agricultural fires (rl-g). This stands in direct opposition to the views of the *única* farmers, who assert that small producers depend on tree shade for crops and livestock, and most fires start on large estates, especially those under Mennonite management, who "burn barriers with total impunity" (ml-uf). Aligning with the position of the Santa Cruz government, ANAPO, the soybean sector association, rejected claims that large-scale producers are major drivers. They accentuate that slash-and-burn practices are not used in soybean cultivation and that most hotspots occur on state-owned lands occupied by new settlements. Drawing on data from the NGO *Fundación Tierra*, they emphasised that around 80% of hotspots originated on public lands, while only 14% were associated with productive areas, of which 9–10% related to livestock. On this basis, ANAPO placed primary responsibility on the government for permitting such clearings, insisting that large producers have not been the main drivers of fires since 2010 (rl-sf).

For their part, the livestock representative argues that the main driver is small-scale slash-and-burn actors, attributing recent megafires to younger generations abandoning the chaco without supervision and to highland settlers clearing land without permits or precautions (ml-cr). He further criticised authorities for directing aid primarily to Indigenous communities, creating perverse incentives where some intercultural groups might ignite fires intentionally to obtain supplies (ml-cr).

2. Political Divide and Immigration

From studies conducted in 2019 and 2023, the government of Concepción concluded that the fires have occurred in sectors of new intercultural communities, razing the land for agricultural production (ml-g). Intercultural informants contended: "We are calmly

conscious that we lit fire nowhere" (ml-ic), highlighting that ABT surveillance is constantly "on top of" them, threatening that monitoring will make it impossible for them to conceal lighting fires, yet they are unfairly accused. They did not attribute intentional arson to any actor, instead pointing to accidental cases. One reflected on her identity shift: "Before, as a canba,[92] I thought the same—that it was the *interculturales* who set fires—but now I am one of them and see that this is a lie" (ml-ic). She traced back the personal history, recounting how her family had once been enslaved and was granted land by her grandfather's enslaver, where they established a community with several families. Securing legal title proved difficult; attempts through local records and the INRA were blocked because they were outside the formal Indigenous territory system: "They said we give [state land] to the *interculturales*, not the Indigenous; they already have their territory of, I don't know how many, millions of hectares." To access state land allocations, they formed an intercultural organisation with migrant women, and she now identifies as an intercultural woman. She described intercultural communities (*interculturales*) as mixed, including both canbas ("people from here") or collas[93] ("people from there"), who share traditional burning knowledge without discrimination. From her perspective, however, state support disproportionately favours Indigenous communities, leaving *interculturales* with little assistance despite their coordination with Indigenous groups when collective action is required (ml-ic)." Geographically, culturally and politically, eastern Bolivia is a world apart from the high plains of western Bolivia, home to the capital, La Paz, where the central government is based, according to state informants from the east. The forestry worker (ml-f) further emphasised that "The resentment of lowland Bolivians towards highlanders is fuelled by the government. They've turned land into a weapon, pitting groups against each other. Meanwhile, the forests burn." The statement provides a firm frame for the following section on land trafficking and titling, illustrating how political and racialised divisions intersect with pyropolitics and resource conflicts.

3. Land Titling and Trafficking

> *"The law promotes not controlled burns, but uncontrolled wildfires". (rl-g)*

Contestation over land distribution and allocation responsibilities emerged across interviews, with different actors attributing authority to different institutions. Indigenous communities and producer organisations described the ABT as the central authority, since it grants burning and deforestation permits. The ABT, however, deflected responsibility onto INRA. INRA, in turn, described its role as dependent on evaluations by the PLUS (*Planes de Uso de Suelo*), a technical regulatory instrument that designates how regional fiscal lands should be used. When PLUS is modified, INRA's mandate shifts accordingly, altering the status of available land. In this way, each state institution displaced accountability, producing a fragmented governance landscape that leaves land conflicts unresolved.

If no decree restricts it, fiscal land is considered available, with up to 50 hectares eligible for clearing. The government issued a presidential decree stipulating that groups with pending land claims could not continue allocation processes if the land had been burned. Cattle rancher organisations opposed, and the decree was replaced by the environmental pause. The INRA observed that such government measures became politically contentious, particularly in Santa Cruz, where private producers resisted acknowledging cattle ranching and illegal logging as primary fire drivers (rl-inra).

INRA positioned itself as a neutral executor of PLUS, but critics challenged this portrayal. The forestry engineer argued the agency actively confiscates forests from private

[92] Indigenous Peoples from the Eastern lowlands of Bolivia.

[93] Indigenous Peoples from the Western highlands of Bolivia.

owners—even those managing sustainably—and redistributes them to settlers, framing this as 'legalised land grabs' with fire as a side-effect (ml-f). The cattle rancher representative similarly described that the only fiscal lands still available are those seized from larger landholders not fulfilling the social-economic function requirements, after which they are reassigned to new occupants (ml-cr). INRA explained that if new occupants request an area, it must first be verified that no prior claim exists and that it is fiscal land. If available, settlement is authorised. After two years, compliance with the social-economic function is evaluated, requiring that production is at least enough for the household, not for profit. If this condition is met, the title is remitted; if not, the land reverts to fiscal status.

INRA clarified that Mennonite settlers can only access fiscal lands through purchase, as allocation is restricted to Bolivian nationals (rl-inra). At the departmental level, however, reports indicated that INRA sometimes allocated public lands to intercultural or Mennonite groups without local coordination (ml-g). A conservation expert described Mennonite colonies using long-term rentals (of a 1000 years) to secure effective land ownership in the Beni region. The arrival of migrant settlers employing mechanical cultivation methods would prompt Indigenous communities to question why they should not scale up practices too, underscoring how land trafficking reshapes both land control and use (ll-po). Monte Verde has not seen such arrangements and community members stated they would refuse such an offer (ll-hi).

In Santa Cruz, officials observed that the Evo Morales government allocated public lands to intercultural communities, framing these moves as politically motivated. They also attempted to modify national Law 741 – locally known as the arson law – criticised for promoting intentional burning as a means of land titling. As one explained:

What begins as a prescribed burn often becomes an unrestricted wildfire. This agricultural frontier advancement is supported by permissive laws that promote land use for both agriculture and biofuels like sugarcane. The law allows each family to clear 20 hectares, so 100 people could legally clear 200 hectares. (rl-g)

From the producers' side, soy representatives described their sector as exposed to legal insecurity. They stressed that regulations presume the landowner is at fault, without distinguishing between intentional arson and accidental fire spread, creating opportunities for land grabbers to deliberately set fire to undermine landowners' tenure. The association complains that due process and defence are not always guaranteed: "How can they identify who burned the land? It's a small spark that spreads in a very dry area" (rl-anapo). Even when invaders were eventually expelled, parts of the land had already been cleared, reinforcing their sense of property rights insecurity (rl-anapo).

At the local level, Indigenous communities described vulnerabilities under the same regulations, albeit within the context of collective property. If a fire is detected on community land, they are presumed responsible, even when it originated elsewhere, is accidental, or is deliberately set by outsiders (ll-po). Because these communities conserve forested areas, the abundance of fuel – forest vegetation and organic material – makes accidental fire spread more likely. Despite occupying very different spaces and positions, both private landholders and Indigenous communities describe the same mechanism that enables settlers to weaponise fire to destabilise tenure. The farmers' association recounted how legal plurality shaped their tenure strategies in a different context. Their organisation was founded after reclaiming idle lands from large estates, which they later discovered were in fact state fiscal lands. Concerned that individual titles could be sold to private actors, allowing external acquisition and exploitation, they pursued collective titles. Despite these precautions, they reported ongoing threats from false

landowners and alleged that private businesses had dispossessed them of 800 hectares by exploiting loopholes in Law 733, suggesting further failures in the legal system (ml-uf).

C. Political Forest and Fire Governance

1. Forest management and forestry

Most communities affiliated with the Indigenous Council of Concepción (CICC) manage an autonomous forest management plan (SFMP) of approximately 2,500 hectares. The decision-making authority rests entirely with these communities – they determine whether to permit commercial timber extraction or preserve the areas (ml-g). Regarding private timber concessions within the Indigenous territory, the municipality maintains a deliberate policy of non-intervention, recognising communities' sovereign rights. Officials state there is no dialogue with councils about forest management, as they would not want to change it, after all, it provides extra income, they argue (ml-g). Significantly, the above position is framed as a respectful and professional policy, but on the ground, it also means non-intervention in case of illegal conduct by third parties, such as logging. Without state protection, the communities' status as rights subjects and the rights to their forest are effectively eroded, and the municipality does not function as a public authority.

The ABT manages logging and management plans. Its task is to oversee and control whether the volume and species of forest defined in the timber transport regulation are actually being harvested. According to APCOB, the ABT profits from illegal logging rather than regulating it. If so, the ABT would be abusing its public authority, and the institutional arrangements would not reflect the community's interests. An interview with the head of ABT's operational unit in Concepción reaffirmed the formal, de facto rules, which contradict the informal forestry practices at the community level:

Timber buyers request management plans. Communities propose 20-year cycles with annual operational plans for sustainable extraction. They lack processing centres and sell timber locally to entrepreneurs who present contracts to the ABT. Contracts are volume-based and certificated. When communities contract with buyers, part of the timber sale revenue goes to the community. (ml-abt)

The preparation of SFMPs[94] is left to external forestry engineers who set fees; if the Indigenous council's assembly agrees, they draft and sign a notarised contract (ml-abt; ml-f).

The community reported that their 18-year-old forest in the management plan burned entirely in two hours, attributed to high fuel buildup after a timber company refused to buy earlier (ll-po; ll-pv). Notably, three SFMPs involved a forestry company that took wood and never paid (ll-hi). When asked about recourse, the ABT reported lacking jurisdiction—communities would need to pursue civil proceedings (ml-abt). The ABT does sanction violations of property management plans (POPs),[95] but these plans only apply to individuals and legal entities, so Indigenous communities require legal personality recognition from subgovernments first (ml-abt). The cacique of Community A mentioned that they are in the process of acquiring legal status. The regional ABT chief revealed that elsewhere, conflict arose and businessmen took legal action that led to a halt of forestry rights. This implies that Indigenous communities can still be at risk of losing the right to use that land, even when legalised through a POP.

The forestry expert identified a disputed land traffic structure undermining sustainable

[94] Sustainable Forest Management Plan. A legally approved, community-developed plan for autonomous regulation of timber use in Indigenous territories.

[95] Property Management Plan. A parcel-level land-use plan required under Bolivian law—primarily applicable to private properties; it does not apply to collectively titled lands.

forestry in wild forests, where most timber is still harvested (ml-f). He remarks that after 30-year terms expire on state lands, forest concessions, including FSC-certified forests, are not renewed and revert to state lands, which the state redistributes to settlers (ml-f). The same process was referenced during a later interview with the departmental government (rl-g). In the case of concessions within TI Monte Verde, there were no records of such areas being occupied by intercultural groups through a state scheme of land redistribution. As to timber origins, the two most important sources are TIs and intercultural settlements. Indigenous communities might secure permits for 20 hectares to sell wood; intercultural communities use their legal allowance—20 cumulative hectares per family—for agriculture, but some also sell timber (rl-g). Note how intercultural communities are encouraged to deforest through politicised and legalised land grabs.

2. Inter-authority Coordination and Conflict

The government of Santa Cruz held that the intercultural communities and local farmers collaborate to contain fires, but interviews say otherwise. The rancher association representative does not believe that opportunities to improve fire management exist. Overall, the efforts to collaborate seem more focused inward than outward, for all actors and sectors. The peasant farmers propose that "leaders of única, *interculturales*, and Indigenous communities must unite," noting that last year's machinery fund failed due to infighting (ml-uf). Collaborations reportedly only occur after disaster strikes; "prevention measures remain non-existent" (ml-f).

The departmental official confirmed the need for better coordination, explaining that political divisions constrain capacity: “it depends on political change toward a greater unity of the three constitutional powers, as hitherto everything always falls on the executive power" (rl-g). Moreover, the government is split: "We continue to work on the farmers' side, but the central government is always limiting us". They acknowledged the charge that Santa Cruz operates with a production-oriented focus, but argued that, ironically, resources are absorbed by central government systems, with only a fraction returning to the department (rl-g). This curtailed the lower government levels' capacity to act during disaster: "The Santa Cruz government has consistently tried to curb fires, but other MAS[96]-aligned departments block our authority to redirect resources to the governor's office, while 40% of our directorate’s implementation budget has been cut" (rl-g). Officials recalled earlier efforts to train communities in first response before Evo Morales’ administration shifted responsibility to the ABT. Much of the aid distributed to 14 sectors was lost to corruption and did not reach the communities. Forest fires were described as an escalating social conflict, with both central and departmental governments hindered by political dynamics in which their power bases depend on popular votes (rl-g). In that light, the regional government and local forestry expert both indicate that the central government's approach trades trees for votes.

This extractivist model seems legally protected. Through normative hierarchy, the department can suggest modifications to land use changes, but legal pronouncements at the national level were overridden (rl-g). The central state enacted overlapping legal frameworks; in particular, the national Law 602 is hampered by bureaucracy, prompting the municipality to create a similar version (Law 141) to proceed faster with incident issues. The national environmental pause decree adds another layer of overlap at the municipal level (ml-g). Fragmented frameworks can create ambiguity about which rules apply and how they are enforced, which is the focus of the next section.

3. Enforcement and Justice

> *“The ABT’s rule exist on paper, but in the field, it is pure chaos”. (ml-f)*

[96] The political party of former president Evo Morales.

This quote followed after asking the forester about how policies contribute to forest fires, to which he answered that the ABT could enforce order, but it is underfunded and corrupt, so no one enforces burn calendars (ml-f). The local ABT unit claims advanced monitoring, but with only eight officers, comprehensive inspection is unlikely. Further, the municipal agency's enforcement ability is hampered by the absence of functional coordination with the ABT or INRA, limited authority and lack of access to information (ml-g):

> *"Despite our repeated requests, INRA refuses to share its land-ownership database, which would enable us to verify fire use authorisation. This information blackout severely hinders our ability to monitor and regulate burning activities across the territory".*

The current enforcement system further complicates these efforts. Environmental Law 700 established fines for unauthorised burns, but the original penalty of just twenty cents per hectare was so insignificant that many landowners simply paid to avoid the lengthy permit application process (ml-g). Interviews revealed how these mechanisms played out unevenly across actors: "Private producers have the resources to control burns. They follow ABT rules because fines hurt. Smallholders burn and pray" (ml-f). In contrast, a única representative emphasised that fines are crushing for peasant communities: "If one member burns a hectare, our entire 1,200-hectare territory is fined, while wealthy farmers can afford penalties and walk free" (ml-uf). Sanctions do not deter damage but exacerbate existing adaptation asymmetries.

In response to such limitations, the municipality introduced a "Life Plan" in 2023 with stronger enforcement mechanisms, now holding legal authority to directly enforce sanctions (ml-g). While this is a potential step forward in enforcement capacity, it still stands that judicial non-enforcement and executive over-centralisation, together with legislative protection of extractivist laws, brought about institutional and geographic inequity: centralised resource policymaking and control in the west, while fires are in the east. Such systemic power imbalances and a weak enforcement system significantly undermine just policy implementation on the ground, where local ecosystems and communities are deprived of state protection and the opportunity for self-organisation.

V. Discussion: Transformations in Agency, Adaptation and Autonomy

The discussion is structured in thematic analyses, concluding with the integrative research question. To begin with, the prevailing narrative of forest fires is analysed, which predominantly demonises traditional practices while expropriating local rights of autonomous land and forest management. After, an analysis is provided of the co-constitutive recoding for all four components, structured per specific property arrangement. Then, a set of in-depth angles is applied to shed light on the contextual configurations and the resulting transformations.

A. The Prevailing Narrative of Forest Fires

Profound discrepancies were found between actors and institutions regarding the origin of and responsibility for forest fires, which I ventured to circumvent by juxtaposing statements and the underlying narratives. The land-use practices of Indigenous communities in the territory are rooted in small-scale farming and agroforestry systems with applied traditional burning knowledge adapted to seasonal conditions. It is common for the government and large-scale agricultural producers to blame Indigenous communities based on their cultural practice of burning. Although this practice incorporates safeguards, accidents can happen and given their use of slash-and-burn, it may be true that fires sometimes do occur on their territory. However, hotspot maps suggest that most fires originated outside the

territory during 2024.[97] An argument raised repeatedly is that Indigenous populations have no interest in burning the forest upon which their livelihoods depend. The same rationale, however, appears to serve other actors as a politically convenient narrative to dodge accusations. While it might be the case that local farmer and producer groups also depend on a healthy environment, the forest dependencies and adaptive capacities operate on different scales and should arguably not be assessed by the same standards. Yet, the dominant narrative often positions them as primary culprits. This reflects how the "coding" of fire and its presumed perpetrators is less about empirical evidence than political expedience: attributing blame serves the interests of those actors who seek to divert scrutiny from their own complicity in land clearing and degradation. The key question, then, is not only what the rules are but also who codes them, in whose interest, and with what consequences for rights-holders,[98] or, in other words, who wins when the forest is lost?

B. The Legal and Political Coding of Fire

Three property arrangements were identified: Indigenous territories as common property, cattle ranchers' and soy farmers' land as private property, and land allocated to intercultural communities as common property that was formerly private or state land. How fire is instrumentalised to reconfigure land rights differs per arrangement.

1. State-owned Land Reallocated to Intercultural Communities

Fire was framed as an instrument in the state's political project, strategically encouraging migration from the highlands to the lowlands. These settlers, organised as intercultural communities, become legitimate rights subjects through state-sanctioned schemes. Government-led land transfers initiate a recoding of assets from forest to agricultural land, with fire functioning as a transitional code that becomes legitimate when it changes how property is coded. Bolivia's land-use system formalises this logic: every parcel is designated a specific use, and unless it is agroforestry, clearance is required. Burning thus becomes the cheapest means of fulfilling state expectations of productive land use.

2. Collective Territory of Indigenous Peoples

In Monte Verde, coding processes may undermine tenure security. Current procedures code collective Indigenous land as a liability: if fire is detected, the community is often presumed guilty, even when fires originate elsewhere. This can enable outsiders to clear land by igniting fires, recoding Indigenous communities as negligent rights holders and weakening their land rights through sanctions. By criminalising fire use, authorities recode Indigenous communities as irresponsible stewards, undermining their legitimacy and moral authority to claim legal protection. Fear of further sanctions discourages traditional land management and restricts use-rights. This constitutes a process of dispossession: tenure rights remain formally intact, but their substance is gradually hollowed out, leaving collective lands more vulnerable to encroachment and exploitation.

3. Private Properties

In the case of private properties, existing rules may code landholders as responsible for any fire detected within their boundaries, establishing rights-subjects whose entitlements are contingent upon compliance. However, the code does not differentiate between intentional, accidental, or externally caused fires. Because state procedures rarely investigate thoroughly, the legal script renders the landholder culpable regardless of circumstance. This creates opportunities for settlers to deliberately set fire and expose producers' land to sanctions, eroding legal tenure security and leaving the asset vulnerable to redistribution.

[97] APCOB. "Evaluación de Impactos Socio-Económicos de los Incendios del 2024 en el Territorio Indígena Monte Verde [Assessment of the Socio-Economic Impacts of the 2024 Fires in the Monte Verde Indigenous Territory]". (*APCOB*, accessed on 05-05-2025).

[98] Lund (n 36) *supra*.

In all three situations, fire mediates the mutual constitution of authority and rights in radically different ways. For intercultural communities, fire consolidates rights and strengthens INRA's authority; for Indigenous territories, fire sanctions undermine tenure while reaffirming ABT's authority; and for private landowners, fire exposes them to dispossession risk through presumption of guilt and weak procedural safeguards. The coding of fire thus ranges from a liability to an enabling script. Nevertheless, impacts diverge because the coding scripts attach differently to private vs. collective property arrangements with different logics of landholding and livelihood.

4. Fire and Land Laws

The legal system enables the three land tenure schemes discussed above, as multiple laws permit controlled burning with minimal sanctions when fires escape control. Within Lund's framework, this demonstrates how public authority is consolidated not merely through the text of law but through selective enforcement and fiscal prioritisation. By defining which fires are legitimate and which actors count as compliant rights-holders, the state both authorises and obscures the dispossession of others. For Indigenous communities, the forest represents an asset whose recognition is contingent on state protection; where the state fails to enforce territorial resolutions or forestry contracts, rights are rendered hollow. A right without enforceability is no right at all. This reflects the struggle between overlapping authorities—ministries, INRA, ABT, local governments—each enforcing laws differently, often to the advantage of actors aligned with the state's fiscal and political interests. Recognition thus becomes fractured and inconsistent, producing what respondents described as legal insecurity. The broader outcome is a legal framework whose official intention – Indigenous Peoples' rights and environmental protection – is undercut by its practical effects. The prerequisites for multiple permits and technical certificates reflect a classic colonial-style approach to political forestry.[99] When property laws are imposed in such a way that they demand people to validate land rights through proof of ownership or, in the case of SFMPs, technical documents without legal protection, the law in itself enables dispossession (theft laundered in advance) and becomes an instrument of power. This represents pyropolitics as 'rule through law' rather than 'rule of law': the codes of legality are bent to serve economic priorities, reinforcing what Lund identifies as the mutual constitution of authority and rights.

C. Fire as a More-than-human Agent

When analysed through an assemblage lens, these divergences take on an additional layer of complexity. Fire is not only a regulatory code but also a more-than-human agent with uncertain and transformative effects: it spreads across boundaries, resists control and transforms forests into new states. Two interlocking trajectories unfold. First, climate change increases forest flammability and droughts, rendering Indigenous territory precarious and weakening use-rights. As such, it changes the use of an asset, which effectively entails its recoding.[100] Second, fire reconfigures the forest frontier, destabilising land tenure and recoding who is a rights subject to which area, reflected by changes in land ownership and use. Thus, both through climate change and arson, fire and the resulting agricultural frontier expansion recode the relationship among assets (land, forest, trees), rights subjects (local communities), and public authority (state and communal institutions). In sum, incentivised burning becomes the impetus of land rights transformations, and as a result, authority is reestablished, assets are reconfigured, and people as rightsholders are privileged or disenfranchised. Seeing climate change and fire as more-than-human agents highlights how land rights reconfigurations are not only

[99] Basnyat, Bijendra, et al. 'Legal-Sounding Bureaucratic Re-Centralisation of Community Forestry in Nepal'. *Forest Policy and Economics*, vol. 91, 2018, pp. 5–18.

[100] Lund (n 36) *supra*.

the outcome of human politics and law but also the agency of environmental forces.

Effects reverberate through the assemblage of assets, rights-subjects, and authorities, launching ripple effects that undermine or reinforce relations among the components. However, zooming in on the framework, there is no proper coding link between more-than-human agents and public authority. Crucially, authorities understand and engage with Nature either as an asset or a rightsholder, meaning the natural environment is considered only when it takes the form of an asset or is mediated by people. As a result, both its agentic power and inherent value are ignored. A regime of possession is held together by "contracts of recognition,"[101] yet more-than-human agents fall outside such contracts, which may be one reason why a regime falls apart. Law and policy are often ill-equipped to adequately account for the non-asset forms of Nature. Hence, Nature must be recognised as a subject of rights itself to properly address environmental challenges that do not purely relate to the utilised version of Nature, such as climate change, by granting legal rights to Nature and its components.

D. Assemblages of Autonomy and Adaptation

The extensive forest loss in Monte Verde has had direct consequences for the local economy. Agricultural production suffered economic losses of Bs. 1,082,100 (€133,599.74), affecting key crops such as cassava, plantain, and coffee (rl-rep). These combined pressures of the Pyrocene and market dependence threaten traditional ways of life. At the same time, Indigenous communities are adapting to the new fire regime and resisting disenfranchisement by self-organisation through territorial governance, diversifying income sources, and adopting fire-free cultivation systems. The nine fire-affected communities with restoration plans reflect this adaptive orientation, which includes agroforestry systems and reforestation with native species (rl-rep).A comparative lens further underscores conditions for viable adaptation. Unlike the tenure insecurities in Monte Verde, the Indigenous territory and protected area Charagua Iyambae has kept fires at bay by combining Indigenous governance with law enforcement.[102] Trained rangers, satellite monitoring, and swift response systems support proactive patrols, while the Indigenous-led 2024 Protected Areas Law institutionalised Indigenous authority to manage land use and thereby enforce territory-wide protection.[103] This illustrates that fire prevention is not simply a matter of knowledge or intent – communities elsewhere also maintain careful burning practices – but hinges on whether rules are actively enforced and backed by institutional support.

While effective fire control ought to begin with territorial sovereignty,[104] in Monte Verde, efforts towards greater sovereignty are hampered by continuous environmental and economic challenges diverting attention from self-determination. A major limitation is the lack of territorial control and recurrent encroachments. On paper, Indigenous communities are recognised rights-holders with collective territorial rights and autonomy over resource management; in practice, however, these rights are continually eroded. Municipal non-intervention in illegal logging suspends state protection, underscoring how Indigenous rights, while formally enshrined, remain fragile and reversible. Bolivia's constitutional framework for Indigenous autonomy affirms self-determination,[105] yet autonomy is undermined by state institutions.

[101] Ibid.
[102] Global Forest Review (n 2) *supra*.
[103] World Land Trust. "Groundbreaking New Law for Protected Areas in Bolivia." (*World Land Trust*, 7 Aug. 2024); IUCN NL. "A Milestone in Indigenous-Led Nature Conservation: Charagua Iyambae Protected Areas Law." (*IUCN NL*, 30 July 2024).
[104] Welch, James R., and Carlos E. A. Coimbra Jr. "Indigenous Fire Ecologies, Restoration, and Territorial Sovereignty in the Brazilian Cerrado: The Case of Two Xavante Reserves." *Land Use Policy*, vol. 104, 2021, p. 104055.
[105] Constitución Política del Estado, Bolivia, 2009, arts. 289-90; Martínez, Sheyla. "Dinámica de la frontera agrícola soyera en Santa Cruz." *Mundos Rurales*, vol. 15, no. 1, 2013, p. 65.

Progress toward full autonomy in Monte Verde Indigenous Peasant Territory has been constrained by: (1) complex multi-level regulatory requirements, (2) dispersed and marginal geographic coverage of communities, and (3) persistent pressures from non-Indigenous actors coveting the territory.[106] This demonstrates how rights and authority are mutually constituted: when Indigenous peoples make claims, they rely on state recognition, which simultaneously consolidates state authority. Autonomy is thus not exercised in isolation but simultaneously dependent on, and in this case, curtailed by, the state and continuously negotiated within overlapping and contested frameworks of recognition and enforcement.

E. Synthesis

Intensifying forest fires are a symbiotic manifestation of both ecological and political forces within forest and farmland assemblages. Forest fires expose fragilities within a political sphere characterised by state-promoted extractivism, permissive laws, institutional fragmentation, and the strategic weaponisation of fire for land grabbing. This governance framework actively dismantles Indigenous autonomy and recodes fire from a traditional management tool into an instrument of delegitimisation at best and dispossession at worst. The fires themselves, as more-than-human agents, actively catalyse transformation by acting upon assets, rightsholders and authorities. They physically and emotionally reconstitute the landscape, leading communities to adapt their livelihoods and reassemble human, plant, and spiritual relations. Simultaneously, fires become a trigger in the legal system to recode land rights, destabilise tenure, and consolidate state authority by penalising traditional fire users while legitimising frontier expansion. Thus, the fires are outcomes of a forest assemblage affected by droughts interacting with a governance system that encourages burning; they are drivers because their unruly agency forces transformations in environmental governance strategies, deeply entangled within the continuous becoming of the assemblage.

F. Limitations and Future Research

Limitations and corresponding ideas for future research arose throughout different stages of the research process. First, despite several attempts, I could not contact Mennonite colonies inside the territory or in Concepción. These immigrant groups, alongside intercultural communities, are notoriously understudied and difficult to access due to their private, insular lifestyle. While I used other actors' accounts, first-hand data would have been valuable to understand their land rights procedures and validate INRA's claim that they only colonise private land. This is relevant given Mennonite colonisation's role in Amazon deforestation across Latin America.[107] Second, I wished to collaborate with ecologists to complement community-observed forest loss with ecological data, though the territory-wide impact assessment partially provided this. Third, the research would have benefited from critical cartography to evaluate authorities' heat hotspot maps, but time constraints prevented this. Maps presented are secondary sources; I accessed GIS data from APCOB[108], as authorities often withhold fire maps. Lastly, another limitation I encountered during analysis was ambiguity around how much participants' political views influenced their standpoint on the rationale behind governance involvement in land redistribution, which varied between socialist and neoliberalist motives or a combination thereof. Flowing from these limitations, future research that investigates the role of Mennonite colonisation and provides richer insights into intercultural communities would be constructive. Research integrating policy, ethnographic, ecological and GIS data could

[106] Martínez, Sheyla. "Dinámica de la frontera agrícola soyera en Santa Cruz." *Mundos Rurales*, vol. 15, no. 1, , 2013, p. 65; Romero, C., and X. Albo."Autonomías Indígenas En La Realidad Boliviana y Su Nueva Constitución." (*CEJA*, Apr. 2009).

[107] le Polain de Waroux, Yann, et al. "Pious Pioneers: The Expansion of Mennonite Colonies in Latin America." *Journal of Land Use Science*, vol. 16, no. 1, 2020, pp. 1-17.

[108] APCOB (n 95) *supra*.

also help to situate local realities more accurately within the governance landscape. I do not claim to have provided comprehensive answers or solutions to address these gaps or other questions that may arise to initiate positive transformation. Rather, I intend to stimulate further dialogue that could inform strategic actions aimed at facilitating such transformations.

VI. Conclusion

This research investigates how intensifying forest fires in Bolivia's Chiquitanía are both driving and resulting from transformations in land (rights) assemblages. The study finds that the original coding of land and territorial governance not only allows but also actively reinforces the large-scale ignition, spread and damage of forest fires. Clashing claims for public authority and land rights create a landscape of legal insecurity that perpetuates ambiguous interpretation and selective enforcement of fire policies, alongside government impunity for illegal practices. Drawing on more-than-human political ecology and theory on (dis)possession, I show that fires, either naturally occurring or actively used to erase and redraw land rights and use borders, recode the relations among rightsholders, assets and public authorities. In the Indigenous territory, this recoding undermines tenure security and delegitimises communities as rights-holders; on state land reallocated to intercultural communities, fire becomes a legitimate script enabling frontier expansion. Treating the natural world and its relations with the human world as components in the making of both natural and human regimes reveals a more accurate view of the dynamic links constituting land (rights) transformations. A more-than-human lens makes these entanglements visible, and I therefore argue that attentiveness to Nature's non-intentional agency is not only emancipatory but also essential for analysing and understanding the constellation of state, human, and non-human actors. Such understandings can contribute to a deeper appreciation of the natural world, honour Indigenous cosmologies, and challenge human exceptionalist thinking that limits effective outcomes. Risk prevention and management fundamentally hinges upon a reconfiguration of land rights regimes that prioritises protection of collective property rights and natural commons over agribusiness expansion. As such, I invite us to rethink forest governance from a relational and political perspective, recognising the limits of conventional institutional responses and the transformative power of more-than-human assemblages in shaping policy and practice.

Acknowledgments

This research would not have been possible without the encouragement and contributions of many. For my link to local partners, I want to thank Kathryn Dix, who moreover offered me indispensable guidance along the way. Many thanks to my amazing supervisors, Sofie Mortensen and Thorsten Treue, for the countless pieces of advice and support. I am also very grateful to my academic mentor, Francois Questiaux, for his heartfelt help. Thank you to all the protagonists, participants, spontaneous informants, bus and motorcycle taxi drivers, and to Bolivian Nature for their invaluable knowledge. I am very grateful to the incredible APCOB team, who transformed my uncertainty into an unforgettable and empowering experience. Further, I would like to thank my immediate family for both their concern and support during these formative times.

Declaration

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Method	Participant Category	Number
Participant Observation (n = 7)	Community A members in their agroforestry systems and fire-affected areas	7
	More-than-human participants (fire, forest patches, flora/fauna)	n/a
Interviews (n = 19)	Community A households	5
	Community A household of cacique	1
	Intercultural community leaders	2
	Peasant farmers leaders	2
	Local cattle rancher association representative	1
	Forestry engineer and timber merchant	1
	Municipal authorities	1
	Departmental authorities	2
	Forest and Land Authority (ABT)	1
	National Institute of Agrarian Reform (INRA)	1
	Regional soy farmer association representatives	2
Photovoice (n = 10)	Community A individuals	10

Table 1: *List of Respondents.*

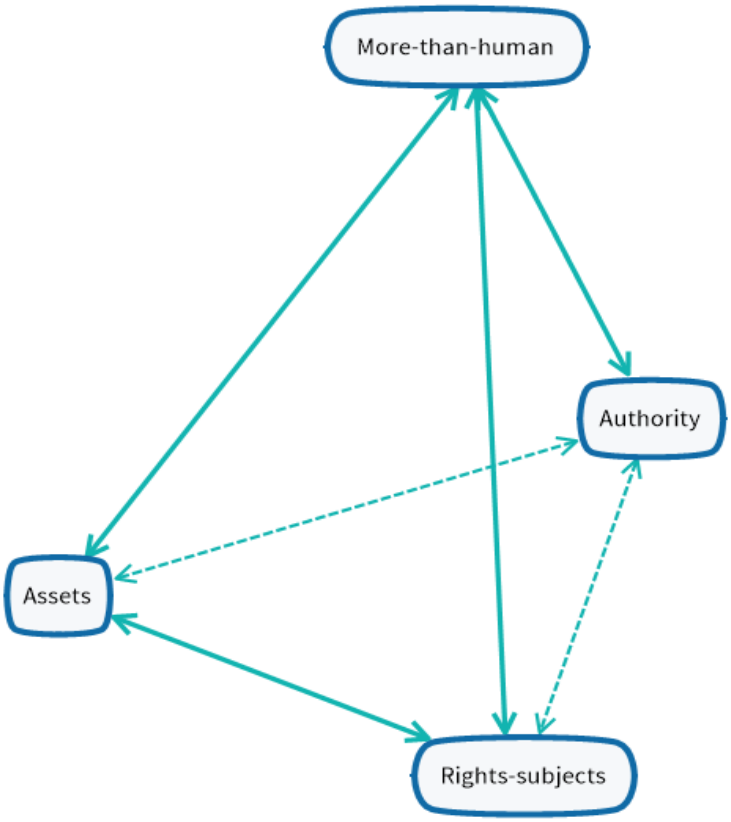

Figure 1: *Three-Dimensional Framework Linking Four Components that Co-Produce Transformations in Land Rights and Assemblages.*

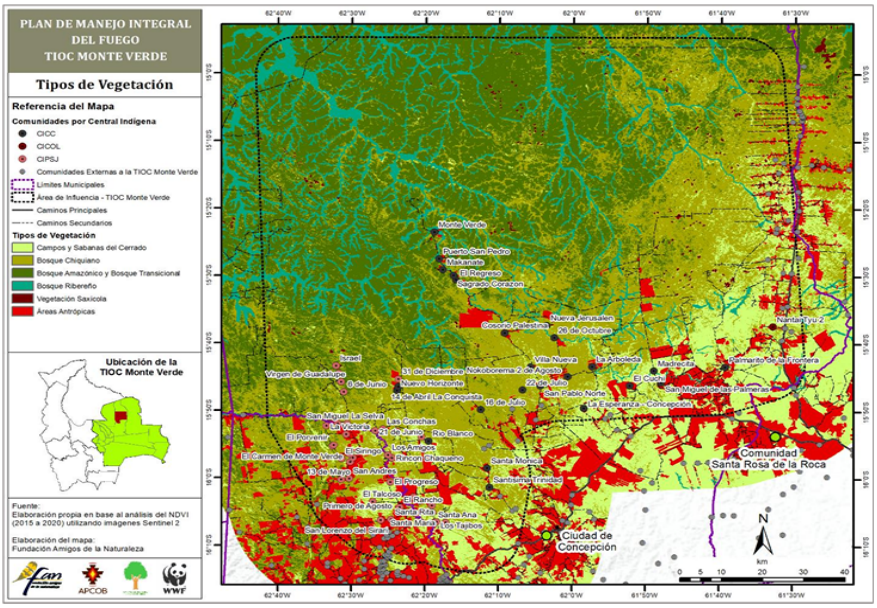

Figure 2: *Land Cover Map.* *Note: The map distinguishes six land cover classes, shaded from light green to bright red: agricultural fields and cerrado savannas, dry forest, Amazonian and transitional forest, riverine forest, saxicolous (outcrop) vegetation, and anthropic areas.*

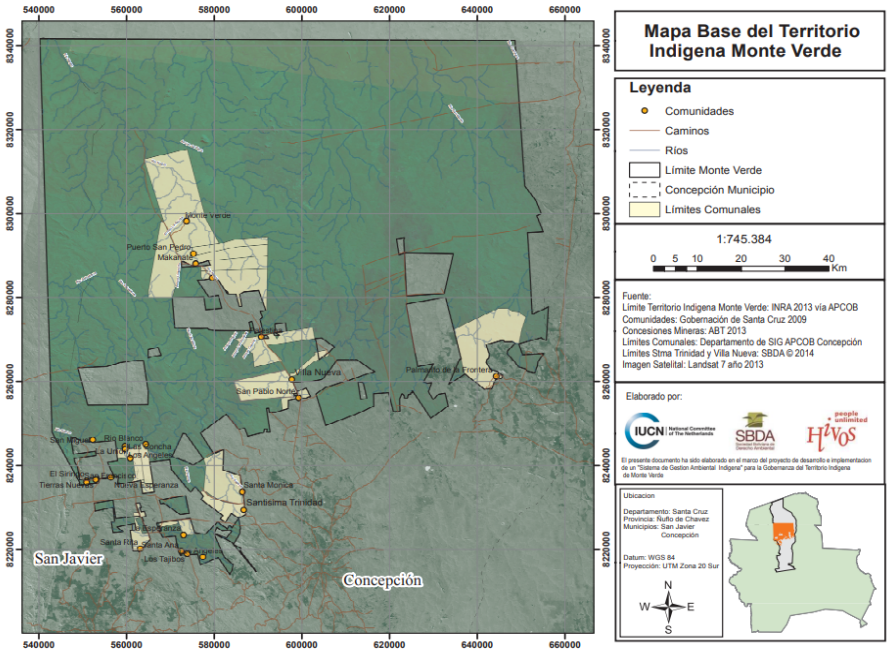

Figure 3: *Base Map of the Territory Developed by the SBDA (Bolivian Society of Environmental Law in 2014.* *Note: Cream-coloured polygons show communal areas surrounding individual communities, which are marked by yellow dots. Red lines indicate roads, with asphalted primary roads located outside the territory and secondary roads extending into it.*