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More-than-human synchronizations expose the fractures of the agrarian commodity frontier in the Bolivian Chiquitanía

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ABSTRACT

Deforestation at the agrarian commodity frontier in Bolivia produces deep territorial fractures, by making Indigenous livelihoods increasingly subject to agrarian extractivism. However, looking at frontiers beyond their fixed spatial representations can unveil spaces of more-than-human agency emerging at the fractures of agrarian extractivism. In this study, we focus on the relations between people, bees, forests and plants, to show how their multiple trajectories synchronize across forests, crops, and villages. Through assessing the synchronizations that underpin honey-economies, we suggest that research can notice unexpected reactions to the social and ecological devastation.

1. Introduction

Agrarian commodity frontiers are among the most rapidly transforming spaces worldwide, driven by processes of capital accumulation spreading over rural territories. They are spaces of global capitalist expansion where the relations that support interconnected human and non-human lives are fractured and dissected into cheap resources and commodities to be incorporated into commodity markets (Kröger, 2021; Moore, 2023; Volpato et al., 2022). Frontier zones' historical meanings can be traced to the "expanding front of colonial conquest and domination," which separated "civilized zones," managed by colonial administrations, from the zones considered wild, unruly and threatening (Serje de la Ossa, 2011). Still today, such separation serves to justify the expansion of agrarian commodity frontiers (hereafter "frontiers") through the appropriation of materials and energy co-produced by humans and other species (Batubara, 2021). In these spaces, livelihoods often deteriorate due to processes of dispossession, or increasing dependency on the fluctuations of globalized markets (Volpato et al., 2022). However, frontiers do not expand uniformly: they produce frictions when they meet existing life-trajectories in territories that remain unruly and irreducible to commodity forms (Tsing, 2005; Tsing et al., 2024; Meyfroidt et al., 2024).

Rural territories are dynamic spaces, composed of everyday practices, symbolic dimensions, and "processes of organization and resistance" (Haesbaert and Mason-Deese, 2020, 260–65). They are not merely discrete spaces with fixed boundaries, top-down control, and subordination. From a Latin American perspective, informed by Indigenous worldviews, territories are experienced as "lived spaces" in which life is made possible through inseparable links between people, plants, animals, landscapes, and the divine, and that unfold over time (Haesbaert and Mason-Deese, 2020, 262; Ulloa, 2025). In other words, these "lived spaces" are constructed by the kinds of relations often denoted by the term "more-than-human", which considers human action as always-already intertwined with the non-human counterparts (Haraway, 2016; Tsing et al., 2024). Thus, frontier dynamics imply the encounter and reconfiguration of different understandings and experiences of territorial relationships and spatio-temporal realities. In this study, we examine how Indigenous people experience these reconfigurations at the intersections of their lived spaces and agricultural commodity frontier dynamics, focusing on honey-economies in one of South America's most active frontiers, the Chiquitanía in Bolivia.

Many studies have shown how contemporary agrarian commodity frontiers are driven by forms of extractivism (Eloísa Berman-Arévalo and Ojeda, 2020; Llanque and Mamani, 2024), shaped by amalgamations of

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political and economic actors, who are linked by asymmetrical power relations, but share a common interest in the rapid, large-scale extraction of resources, mainly for export (Svampa, 2022). Agents of agrarian extractivism include national states and economic elites, cross-border land rentiers, global financial investors, and a multitude of workers and settlers seeking to earn a living on the edge of frontiers (Borras and Franco, 2024; le Polain de Waroux, 2019; Meyfroidt et al., 2024; Pratzer et al., 2024). Their combined actions produce irreversible territorial fractures when resident populations, often Indigenous people living in areas of expansion, see their livelihoods violently transformed (Veltmeyer and Ezquerro-Cañete, 2023).

Deforestation is a highly visible manifestation of these dynamics, driving relentless reconfigurations of life-trajectories (Meyfroidt et al., 2024; Li, 2014). Through remote sensing and satellite imagery, many studies have delivered alarming images and assessments of the magnitude of deforestation, and have provided useful tools for global awareness-raising campaigns and political action (Segarra et al., 2024) (see Fig. 1). However, remote sensing is rarely accompanied by the situated narratives and experiences of those who have directly lived the ravages of extractivism (de la Ossa and Margarita, 2017; Segarra et al., 2024). Analyses of frontiers that rely solely on remote sensing, as a consequence, risk overlooking people's everyday entanglements with frontier dynamics, including the forms of resistance that rely on territorial and more-than-human relations. In contrast, situated perspectives on frontiers can reveal more fluid and kaleidoscopic images, resisting fixed representations (Robbins, 2001).

Situated perspectives can show that, despite territorial fractures, life forms are reactive and expressive, and their historical trajectories cannot be reduced to a total submission to globalized capital and markets (Moore, 2015; Tsing et al., 2024). They display networked agencies that are not totally under capital's control, in spite of the many violences through which frontiers operate (Serje de la Ossa, 2017; Tsing, 2021). In Latin America, unruly relations unfold through everyday collective practices in rural territories, involving intimate human and non-human relations that persist despite "the exploitative logic of agrarian capitalism" (Eloísa Berman-Arévalo and Ojeda, 2020, 1596).

One such relation is between humans and bees. Land-use changes affect resource availability for bees, forcing their adaptation to different agro-ecological configurations and affecting honey production (Chévez et al., 2023; Cely-Santos, 2021; Padilla Raudales, 2022). Bees participate in and live from the reproduction of diversified agricultural landscapes, mainly through pollination (Aldasoro Maya et al., 2023; Chévez et al., 2023; Cely-Santos, 2021). Bees move across landscapes and take part in people's livelihoods, especially through beekeeping, forming dynamic relations that become part of collective identities and senses of territorial belonging (Delgado et al., 2022; Cely-Santos, 2021). Therefore, examining human-bee relations can demonstrate how the convergence of life-trajectories is constitutive of frontier dynamics.

Agrarian commodity frontiers entail a bewildering mix of co-occurring spatio-temporal trajectories, agencies and processes. Such mix produces territorial superimpositions or "motley territories", a term which scholars have used to describe "diverse territorialised social relations that were established in different epochs but continue to coexist in often unarticulated ways" (Jasser et al., 2022, 2). Motley territories are made of multiple societies and their historical trajectories, which coexist but do not necessarily blend. For Rivera Cusicanqui (2018), motley territories should be understood as unfinished and messy processes. They contain aspects of the past entangled with the present, as colonial legacies mix with contemporary practices and agencies. Such heterogeneity unveils the disparity of the modern Nation-State and calls into question the uniformity and exclusive agency of globalized capitalism (McNelly, 2022; Serje de la Ossa, 2017). Motley territories exist in friction with wider capitalist dynamics, but just as analyses prioritizing satellite imagery risk missing situated experiences of frontiers, social histories of frontiers that focus only on long-term historical-economic change risk missing the dynamism of motley spaces (Rivera Cusicanqui, 2018). This heterogeneity can be better noticed in the everyday practices that draw people into relation with others, making and remaking territorial relations.

In this study, we understand agrarian commodity frontiers as motley territories, and we focus on people's everyday experiences of co-occurring and more-than-human trajectories, agencies and processes, which we call "synchronizations." With this term, we refer to the situated temporalities that constitute frontiers, entangled with, but not solely determined by, the historical dynamics of capitalism. This interpretation draws on the notion of "assemblages," as temporary entanglements of heterogeneous entities affecting each other, forming networked identities subject to change, and producing open-ended results (Turker and Murphy, 2021; Woods et al., 2021). Synchronizations involve the spatio-temporal coordinations of multiple life-forms, which we can understand as being related within assemblages or "patches" (Tsing et al., 2024). Noticing synchronizations invites thinking about how motley territories continue to exist despite the ravages of agrarian extractivism, and how multiple life-forms participate in the making of frontier relations.

In this study, we aim to understand how people living on frontiers experience synchronizations in their everyday economic lives. We focus on honey-economies, a topic that emerged during fieldwork, demonstrating how frontier dynamics and the pressures of extractivism affect the relations linking humans, bees, crops, and forests. For our study, we consider that economic life goes well beyond the spheres of commodity production and globalized markets (Miller, 2020; Quijano, 2012). So-called "diverse economies" are constantly unfolding from more-than-human relationships, through which the provisioning practices and abilities that support interrelated livelihoods are in constant negotiation and co-constitution (Gibson-Graham and Dombroski, 2020; Ortiz-Przychodzka et al., 2023). By exploring how residents of two Indigenous communities in the Bolivian Chiquitanía narrate economic lives involving honey-economies, we draw larger conclusions about frontier dynamics and the persistence of diverse economies in this region, situating them in the motley mix of agrarian commodity frontiers.

2. Case-study and research approach

Bolivia is among the countries with the highest deforestation rates globally (Czaplicki Cabezas, 2024; Vos et al., 2020). Soybean plantations and pastures for cattle raising are rapidly replacing tropical rainforests, dry forests, shrubland and savannas in the Eastern lowlands (Llanque and Mamani, 2024; Morales Escoffier, 2024). This is especially the case in the Chiquitanía, home to a large tropical dry forest and a key ecological transition area between the Amazon rainforest to the North, the Pantanal wetlands to the East, and the Chaco dry lands in the South (Maillard et al., 2024; Vides-Almonacid et al., 2007). Still, deforestation in this region has received little attention compared to its neighboring relatives.

The main Indigenous population in the Chiquitanía are the Chiquitano people, a name probably established by Spanish colonizers in the 16th Century and consolidated in the Jesuit missions in the 17th Century, imposing the most used language to simplify territorial management (APCOB, 2016; Arrien, 2008). Today, in addition to Chiquitano people, the region is inhabited by communities of lowland origin, such as the Guaraní, the Guarayo, and the Ayoreo (Vides-Almonacid et al., 2007). Currently, half of the estimated 20.5 million hectares of the Chiquitanía is owned by the Bolivian State[1] 25 % is privately owned, 13 % is Indigenous territory[2] and 10 % belongs to small landholders,

[1] Different illegal land occupations exist in public lands, including settlers from other regions, and Mennonite communities (Fundación Tierra, 2021).

[2] *Territorios Indígenas Originarios Campesinos* (TIOCS) are collective land titles granted to indigenous communities showing a common ancestral economic and cultural organization (Fundación Tierra, 2021).

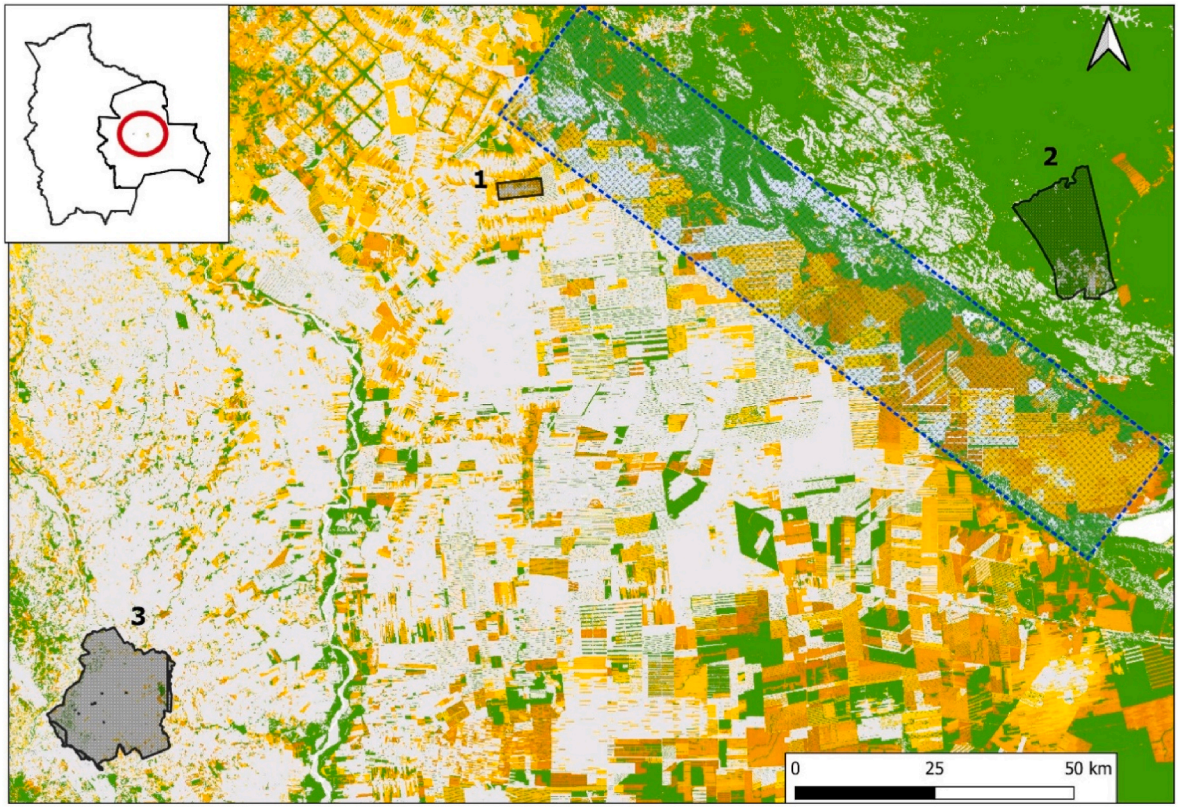

Fig. 1. Location of (1) Cordillera 16 de marzo, (2) San Juan de Lomerío, Chiquitanía, (3) city of Santa Cruz de la Sierra, Department of Santa Cruz. The blue stripe indicates the hypothetical limits of the agrarian commodity frontier. Green: forest cover in 2000. Orange: deforestation between 2000 (lighter) and 2020 (darker). Light grey: non-forest covers, including agribusiness plantations to the left of the blue stripe, and to the right, non-forest ecosystems such as grasslands and hilly landscapes with rocky soils slowing down frontier expansion. **Source**: The authors with data from Mapbiomas, GeoBolivia and the Amazon Network of Georeferenced Socio-Environmental Information (RAISG), October 2024.

including Indigenous communities with collective land titles (Fundación, 2021).

Historically, the Chiquitanía has been an area of extraction of cheap materials, such as timber and minerals (Vides-Almonacid et al., 2007), and cheap labor and land (McKay, 2018a; Arrien and Viana Chuvé, 2007). Its landscapes have been transformed by colonial enclaves, such as the Jesuit reductions and the *haciendas,* which sourced labor for plantations and cattle ranching by enslaving or otherwise exploiting the local workforce (Arrien and Viana Chuvé, 2007; Balza Alargón, 2001). The patronage system, a form of slavery, officially ended in 1939, but was replaced by other forms of forced submission of workers, i.e. indebtedness, in *haciendas*. The agrarian reform of 1953 redistributed land, but its implementation was slow and indebtedness did not completely disappear (Arrien and Viana Chuvé, 2007).

Current dynamics of frontier expansion started in the late 70s with export-oriented sugarcane, soybean, sorghum and sunflower (McKay, 2018a). Transport-infrastructure projects (e.g. USAID, 1979) were undertaken to accelerate the integration of the Chiquitanía into globalized markets connected to soybean agribusiness in Brazil, Paraguay, and Argentina (Song et al., 2021). Since 2006, Bolivia has experienced a unique process of deep political transformation, including the adoption of a new constitution in 2009, recognizing the inherent link between the rights of Indigenous people and territorial pluralism (Jasser et al., 2022; Eichler, 2019). Yet, such a process has been undermined by the State's persistent extractivist policies, which consider natural resources of strategic national interest, often aligning with agribusinesses' interests, especially in the lowlands (McKay and Colque, 2021; Eichler, 2019). Through these dynamics, the Chiquitanía and its Indigenous communities are still subject to the demands of agrarian extractivism within dynamics of global capital accumulation.

In this context, our research focused on two contrasting communities. The community of 16 de Marzo-Cordillera (hereafter, 'Cordillera'), founded in 1979, is located in the epicenter of the expansion of the agrarian frontier in the late 1980s (Colque et al., 2021; Haas, 2023). Its founders are Guaraní people who migrated in the 1970s from their lands of origin, i.e. in the vicinity of the Chaco region in the South-West of Santa Cruz, initially looking for work in sugarcane plantations. They benefited from land distribution and obtained 2400 ha in the municipality of San Julián, North of Santa Cruz in the Chiquitano dry forest (Colque et al., 2021; Haas, 2019). Relatives moved in gradually to form a community. At present, its 153 families, around 900 inhabitants (Colque et al., 2021), hold a collective title called 'distrito indígena', which gives them part of the annual public budget of San Julián. Their land, initially covered by native vegetation, has been converted into soybean, sorghum and sunflower plantations, with only a few self-provisioning crops, and almost no forest left. The agricultural commodity boom left few alternatives for Guaraní farmers who ended up renting their land to neighboring farmers, mainly Mennonite and Andean settlers that possess expensive agricultural machinery and access to credit.

The second community is San Juan de Lomerío (hereafter, 'San Juan'), in the municipality of San Miguel de Velasco in central Chiquitanía. Its Chiquitano inhabitants hold a collective land title of 37000 ha at the outskirts of the agrarian frontier. It is surrounded mainly by dry forests and, increasingly, by cattle ranches owned by large companies, Mennonite families and recent Andean settlers. Former workers of the *haciendas*, who suffered exploitative labor conditions, founded San Juan at the end of the 19th Century. Nowadays, this community is dedicated to small-scale agriculture and cattle raising, mainly for self-provisioning, along with hunting, forestry and, increasingly, work in the surrounding agribusiness properties. San Juan collectively manages a forest covering

18000 ha. Both communities show different degrees of dependence on external markets, much higher in Cordillera, reflected in the monetization of daily life.

For our research, authors one and three conducted semi-structured interviews between October and December 2021 in the city of Santa Cruz de la Sierra, capital of the state of Santa Cruz, and in the Chiquitanía. This period corresponds to the transition between the dry cold season, prone to massive wildfires and deforestation, and the warm rainy season, when the *comunarios* (community members) start planting. After initial workshops with community leaders, we identified common interests, explained our objectives, and defined the use of ethical protocols for interviews and data analysis.

We then applied snowball sampling at two levels. On the regional level, we built an initial list of key institutions and Indigenous leaders to interview in the city of Santa Cruz de la Sierra and across the Chiquitanía, whose narratives refer to the whole region. We asked each interviewee about other relevant actors in order to understand the historical dynamics, as well as the social, economic and environmental characteristics and challenges of the region. As a result, we completed 28 interviews (Table 1), with interviewees including leaders of Indigenous organizations, NGO members working on biodiversity conservation and local knowledge, private organizations marketing handicrafts or promoting sustainable agriculture, journalists of three radio stations collaborating with Indigenous communities, and members of three research institutions.

On the community-level, with local Indigenous leaders, we built an initial list of the economic activities of their communities, and asked which individuals were especially knowledgeable about those activities. We then asked the same question to each interviewee to move the snowball forward until we reached saturation, with 60 semi-structured interviews: 27 individuals from 25 households in Cordillera, and 33 individuals from 23 households in San Juan.

During the interviews, we left space for unstructured conversations to facilitate the documentation of interviewees' own narratives. We kept track of the topics that we did not want to overlook: (1) main activities undertaken by the person interviewed; (2) key economic activities in the region and in the communities; (3) social-environmental challenges, and (4) environmental conflicts and implications for people's daily life. We also engaged in unstructured conversations and participant observation during household and agricultural activities, community gatherings, and NGO-led workshops with Indigenous organizations.

We analyzed the interviews by assessing people's narratives of their everyday practices and relations with other human and non-human beings (Spiers and Lewis, 2016; Tacchetti et al., 2022). "Narratives" refers to communicative processes through which people connect different events, experiences and encounters, and give meaning to their everyday relations (Koch et al., 2021). The focus on narratives contrasts with the totalizing perspective of agrarian commodity frontiers, by adding people's situated perspectives, including their acknowledgement of agencies beyond the human.

Table 1
Number of interviews at the regional and community levels per type of actor.

Type of actor			Individuals	Women	Men
Regional level			**28**	**12**	**16**
	NGO and international cooperation		10	5	5
	Research		5	4	1
	Private organization		3	0	3
	Indigenous leader		6	2	4
	Local radio stations		4	1	3
Community level	**San Juan de Lomerío**		**33**	**12**	**21**
	Age	<20 years old	4	2	2
		20–40	11	4	7
		40–60	4	1	3
		>60	14	5	9
	16 de marzo Cordillera		**27**	**12**	**15**
	Age	<20 years old	1	1	0
		20–40	8	2	6
		40–60	9	6	3
		>60	9	3	6
Total			**88**	**36**	**52**

At the community level, we focused on honey-economies, because of their important presence across the Chiquitanía (Adler et al., 2023; Morón et al., 2023; Townsend et al., 2021), and their intersection with varied economic activities in Indigenous territories. Honey-economies involve the interaction of humans and bees, mostly stingless bees of the dry forest, and the European honey bee (*Apis mellifera*), in practices of honey collection and beekeeping, or during other common activities including farming, hunting and logging across forests, farms and villages in the Bolivian lowlands. Honey collection is mostly carried out in forests and croplands, by cutting down the whole tree with a chainsaw when the beehive is located too high, or opening a hole in the trunk with an axe when it is accessible. Beekeeping is done in windbreaks, in open space in villages or in house patios, generally with home-made wooden boxes and in some cases, especially in Cordillera, with professional boxes bought by technicians from NGOs or companies interested in promoting honey markets. In the Chiquitanía, there are at least 27 registered stingless bee species (Townsend et al., 2021), which are important pollinators of wildflowers and cultivated plants (Adler et al., 2023; Morón et al., 2023; Townsend et al., 2021).

To our knowledge, studies about people-bee relations in the Chiquitanía are scarce, and few consider the context of an expansive agrarian extractivism. However, we found some evidence that honey is an important part of Indigenous people's daily life, mainly because of its uses as food and medicine (Adler et al., 2023; Lastarria-Cornhiel et al., 2008), and sometimes as a marketable good (Radding, 2001; Arrien and Viana Chuvé, 2007). Often, medicinal uses of honey, and beekeeping are led by women in charge of household care and leading forms of collective organization (Adler et al., 2023; Nostas Ardaya and Sanabria, 2010; Rodríguez et al., 2023). Some works mention cultural aspects of honey collection in the Chiquitanía, especially in people's narrations of daily encounters, conflicts and negotiations between humans, bees and forests (Arrien and Viana Chuvé, 2007; Zuna et al., 2023). Honey collection is connected to the most common forest uses, as it is done in association with logging, collecting wild plants, and hunting, and to the wider community life through sharing, exchange, and consumption. Honey and beekeeping have been topics of interest in initiatives and projects proposing economic alternatives based on sustainable forest management (Adler et al., 2023; CICOL, 2019; Inturias et al., 2019), possibly due to their multiple territorial associations.

Below, we present an account of interviewees' narratives. In the following section 4, we describe the narratives of the fractures created by the expansion of the agrarian frontier. In section 5, we recount people's experiences of intimate synchronizations in honey-economies. In section 6, we discuss the links of diverse economies to wider frontier's trajectories.

3. The fractures of frontier expansion

As the agrarian commodity frontier expands through deforestation, fractures appear in the relationships between people and forests, and in the interconnected lives of humans and non-humans that constitute their diverse economies. People experience these fractures as the result of a force that pushes all life trajectories in the Chiquitanía to align with globalized capitalist markets. Many life-trajectories cede; some resist. In any case, diversity vanishes and the monotony of large-scale monocrops takes its place, motivating feelings of loss and lack of alternatives for Indigenous people. In this section, we provide an overview of the politics of frontier dynamics in the Chiquitanía, and we describe the manifestations of the resulting territorial fractures in people's narratives.

3.1. Markets and politics drive deforestation

The expansion of the commodity frontier in the Chiquitanía has multiple dimensions that create conditions for unpunished deforestation[3] and land grabbing (Colque et al., 2022; Llanque and Mamani, 2024; Morales Escoffier, 2024; TIDN, 2020). This is made possible by an economic and political context in which the Bolivian government considers agricultural commodities as a key resource to finance policies of social change[4] (Colque et al., 2022; Svampa, 2015; Vos et al., 2020). The extractivist agenda has deepened confrontations in the lowlands, especially in Indigenous territories expressing environmental concerns (Llanque and Mamani, 2024; Zambrana Lineo, 2020). As Jasser et al. (2022) have demonstrated, despite the constitutional recognition of territorial plurality in Bolivia, the government has also promoted a settler and agribusiness occupation of the Chiquitanía, taking an internal colonial approach in the incorporation of land into its centralized national project.

One central manifestation of the territorial disputes in the region is deforestation. Between 2010 and 2022, 2,3 million hectares were cleared in the department of Santa Cruz, most of them in the Chiquitanía, which has lost around 30 % of its original forest (Quintanilla et al., 2023). In our interviews, people attribute deforestation to shady actors and networks acting with impunity across scales. At the regional level most interviewees agree that deforestation is caused by the common interests of markets and politics in expanding agrarian extractivism in the region. For instance, a forestry engineer explained that when the prices of timber are too low, capital owners prefer to invest in clearing the forest to introduce monocrops instead of buying timber. Complex networks of actors that are involved in deforestation include large- and medium-sized companies, Mennonite communities[5] and recent Andean smallholder settlers,[6] all generally supportive of the governing party's agrarian politics. A large part of this land rush is reflected in strategies of land leasing and contract farming used by regional agribusiness networks as alternatives to direct land acquisition. They include transfers of transgenic seeds, agro-chemical fertilizers and heavy machinery to the increasingly indebted farmers (le Polain de Waroux, 2019; Pratzer et al., 2024). As a result of the territorial projects of agrarian extractivism, the Chiquitanía has become a disputed land at the expense of its social and ecological diversity (Llanque and Mamani, 2024; Maillard et al., 2024).

Governmental and agribusiness narratives tend to point at Indigenous people's responsibility to protect the forests, sometimes accusing them of deforestation and wildfires.[7] Yet, deforestation in the department of Santa Cruz between 2010 and 2022 was driven by medium and large cattle ranches, large agricultural companies, Mennonite communities, and Andean settlers with medium-size properties. Smallholder farming (usually non-mechanized farms with less than 50 ha), including Indigenous communities, account for 1 % of deforestation in this period (Müller et al., 2024). According to a Chiquitano leader:

> Local Indigenous people do not deforest much; they extract timber selectively, and leave fallow land (…). Externals are arriving to buy land, for soybean, thousands of hectares. They don't even employ people from here, and they leave no forest standing.

Governmental and agribusiness narratives use ethnicity to generate divisions in social movements and to divert public opinion from the problematic commitment to extractivism (McKay and Colque, 2021; Swift and Barriga Dávalos, 2024).

A coordination of interests between markets and politics can be seen in the governmental support to some demands of powerful agribusiness. This support includes access to land, public credit, and laxity in the use of transgenic seeds regardless of the Constitutional and legal limits (Llanque and Mamani, 2024; McKay, 2018b), and the fact that such actions often run counter to the State's own political, environmental and decolonial discourses (Andreucci et al., 2023; Czaplicki Cabezas, 2024; Morales Escoffier, 2024). Such support is reflected in controversial law packages that enable land grabbing and deforestation at the expense of Indigenous territories and biodiversity (Colque et al., 2022).[8] In October 2024, the government authorized the use of transgenic soybean for the production of biofuel (Salinas, 2024), after negotiating with agribusiness representatives at least since 2014, during the Evo Morales term (Fundación, 2024). In our interviews, one researcher affirmed that ecological degradation favors the expansion of large-scale monocrops by increasing the demand for improved drought-resistant seeds, which plays into the hands of the agribusiness lobby in favor of legalizing the imports of transgenic seeds. Moreover, some NGO members mentioned that the controversy over genetically modified seeds reflects national electoral dynamics with the Chiquitanía as a backdrop. Allegedly, the government is trying to appease agribusinesses actors sympathetic to the political opposition, while it promotes territorial occupation with settlers predisposed to its agenda. One NGO interviewee characterized this as "a systematic plan for devaluing forests to stimulate territorial occupation, because it is better to have people who vote for your agenda instead of forests". These policies fuel expectations for expansive agribusinesses in the region, triggering one of the most rapid land rushes in Latin America (Colque et al., 2021; Czaplicki-Cabezas, 2023; Reis et al., 2023; Song et al., 2021).

Some NGO members expressed resignation and concern regarding deforestation and the proliferation of large-scale monocrops. They feel that the "agroindustrial model" treats people's economies as obstacles for economic progress, and forests as 'idle land (…) that has to be privatized' (Interview, NGO member) and put to work to produce commodities. Our interviews suggested that many Indigenous people are drawn in by the promises of a transitory commodity boom subject to global price variations. As the promises fade, people turn to timber extraction, to seasonal agricultural work, or they rent their land, or adapt it for cattle raising by planting improved pastures. In all cases, Indigenous livelihoods are forced to align with the rhythms of agribusiness and globalized markets.

In this context, the influence of globalized markets has expanded quickly and many Indigenous communities are struggling to keep to the slower rhythms of extraction that characterize their practices of selective logging and collective forest management. With deforestation and the disruption of ecological connectivity, many NGOs and Indigenous community-members observe that rain is getting scarcer, agriculture is getting harder, and livelihoods depending on biodiversity are collapsing. In consequence, Indigenous people's economies become increasingly intertwined with logging and large-scale monocrops as sources of work and income, fracturing their relationships with forests.

[3] Aside from deforestation, wildfires have also been rampaging the region. For an analysis of wildfires, see Jasser et al. (2022), Cole et al. (2023), and Colque et al. (2022).

[4] This political and economic approach was already present in the government led by Evo Morales, which deepened agrarian extractivism in Bolivia (McKay and Colque 2021).

[5] Mennonite communities arrived in Bolivia in the 1950s, and have grown in the lowlands especially in the last 15 years. They are central actors of deforestation, planting large-scale soybean monocrops (Morales Escoffier, 2024).

[6] Andean settlers also identify as Indigenous, of Aymara and Quechua origins, grouped by the term *interculturales*. Lowland Indigenous peoples differentiate Andean settlers from their own ethnicities using the term *interculturales* or sometimes *campesinos* (peasant, smallholder farmers).

[7] Moreover, many environmental discourses blame Andean smallholder settlers in the lowlands for deforestation, relying on racist discursive strategies to mask the fact that this group is instrumentalized by the extractivist system (Swift and Barriga Dávalos, 2024).

[8] For instance, several legislative initiatives during 2013–2020 have been criticized for condoning or reducing fines for illegal deforestation, facilitating the use of transgenic seeds, and turning a blind eye to land grabbing (Colque et al., 2022).

3.2. Fractures caused by deforestation and logging in the two indigenous communities

The course of territorial changes in Cordillera and San Juan are visible in their historical trajectories of deforestation and timber extraction since the 1970s. In both sites, fractures in people's livelihoods have progressively emerged. Yet, the trajectories through which the economies of these communities have been forcibly aligned with the expansive forces of the agrarian commodity frontier differ.

Two major processes are at the root of deforestation in Cordillera: Guaraní residents' quest for favorable land ownership, and the instrumentalization of these aspirations by agricultural capital owners in search of cheap resources (Haas, 2023). According to people's historical accounts, soon after the founding of the community, timber traders arrived with machinery, sometimes extracting more wood than agreed. Other actors arrived progressively, mainly neighboring settlers aware of Guaraní people's economic needs, and planted the idea that there was no alternative to commodity monocropping to make a living. They offered leasing contracts including the provision of agrochemical inputs and heavy machinery to clear the remaining forest and plant soybean, sunflower, sorghum and maize. Residents put their land, workforce, and seeds in exchange for an annual income that is insufficient to support an entire family; thus people have supplement their income with alternative jobs (Haas, 2023).

Without forests, livelihoods are under stress. Forests used to be sources of food and timber, and barriers against the strong winds without which soils get eroded and lose fertility.

> We have cleared a lot of forest; we did not even leave a windbreak. Droughts and frosts are now affecting [us] more, and we have to go find [wild] animals farther away. People can barely get what they need, so they rent their land because they are afraid of failing (Community leader).

In the words of a community member, people feel 'as if there was stagnant water in a well, as if there was no way out'. Even though some did not intend to remove the entire forest from their plots, they had no alternative. They lacked the financial capital to work their land, so they had to clear it so that others would rent it. Now, because drought and pests affect the agricultural output, incomes from land rental are not sufficient. Thus, most men spend weeks working in cattle *haciendas*, agribusiness complexes, road construction, or in urban seasonal jobs. Women try selling food, beverages, handcrafts and traditional clothing in city fairs, but transportation costs usually make this strategy non-profitable. Without forests, options to make a living are scarce. As one of the founders of Cordillera affirms, although reforestation seems the only hope for the future of the community, no one is able to bear its costs.

In San Juan, before timber became profitable, the community was hardly accessible, as one of the first loggers explained. He arrived in the 1980s, hired by a German entrepreneur to start timber extraction. Various wood companies followed, set roads, and committed to building a health post and a dam, but never delivered. Thereafter, successive deals to extract timber often resulted in companies deceiving the community by extracting more than agreed, refusing to pay a fair price for the timber, or making secret deals with local authorities against common interest. After the creation of the national authority for the control of forests and land in 2009, community members decided to organize to sell wood legally and fight illegal logging. Some of the problems remain, including the pressures from loggers and the alleged corruption of officials and companies. And yet, *juaneños* (inhabitants of San Juan) have managed to preserve their own forest management.

People in San Juan value their forest management plan, but regret that it has not prevented the deterioration of biodiversity. Besides illegal logging, some residents blame people's sense of perpetual forest abundance amidst increasing economic needs. Still, many *juaneños* disapprove the changes brought by the rush for timber:

> There is no longer that love that we used to have for the forest (…). Our forest is our heritage, but in some years, there will be no wood. In other places, there is already none. (*comunario*, San Juan)

> If you introduce a machine, the forest doesn't grow anymore (…) many settlers come here to clear a piece of land with machines, day and night (…), they don't even ask for permission or leave something for the people. (*comunario*, San Juan)

According to a *comunario*, only five timber species persist in the community forest, compared to ten in the 90s. This is still significant, given the scarcity surrounding San Juan, as he explained.

But in juxtaposition to these views, others argue that *juaneños'* management practices are responsible for the comparatively better condition of their forests. This viewpoint underscores that, unlike Mennonite and Andean settlers, people in San Juan do not use heavy machinery, only chainsaws. They select timber to allow forest regeneration. In agricultural fields, they use axes and *machetes* to clear the plots and to maintain some forest patches; and they rotate between plots every four years to allow for soil renewal.

Over the years, deforestation and the logging business have changed the economies of both San Juan and Cordillera. Gradually, small stores offer products that people are willing to pay for. This creates new dietary habits, and needs for utilities and services such as internet, electricity and water, and construction materials. As a community elder in San Juan illustrated, 'we used to sleep in hammocks, but the [logging] companies brought beds.' He thinks that many things improved, such as the access to public services, but also that people became less interested in agriculture because it became harder. There are few alternatives for earning an income, but people rely on money to buy what they need. Moreover, as biodiversity vanishes, livelihoods are affected. According to a researcher in Santa Cruz, people still consume some traditional foods and medicines, but wild plants are harder to find as the forest is cut down and the land is privatized. As a consequence of extended droughts and water depletion, which residents attribute to deforestation, home gardens and local seeds are being lost, placing a larger burden on women to ensure daily food provisioning for their families. Economic diversity and self-sufficiency are weakening as economies become commodity-dependent.

The stories of both communities show a picture of frontier expansion in the Chiquitanía with multiple layers and temporalities involving the encounter of globalized markets and politics, and the trajectories of each community made of different but simultaneous events. Deforestation, uncontrolled logging and biodiversity loss are manifestations of the fractures left by frontier expansion. However, as we delved deeper into those fractures, our conversations also revealed other trajectories re-knitting territory with more-than-human relations. To illustrate these, the next section turns to the honey-economies that unfold in forests, farms, and villages.

4. Human-Bee intimacies synchronize honey-economies

In this section, we focus on everyday stories that unfold in both study communities, and that involve synchronizations of honey-economies. By following the thread of honey and bees, we heard about encounters unfolding in different places such as forest patches, agricultural plots, and the streets, squares, and houses of villages. Stories of human-bees encounters express disputes, collaborations, and mutual affections through which diverse economies emerge from the fractures of the agrarian commodity frontier.

4.1. Collecting wild honey amid forest economies

Trees are magnets for bees and for people; they are places where their trajectories meet. Many encounters between people and bees happen in forests, where people can notice bees' various interactions with plant species, and observe how these influence honey production.

In our conversations, people described the inseparable relationship between bees and trees to explain why there are always more in the forests than elsewhere: 'bees are of the trees' (*comunaria*, San Juan). People notice how bees 'look for trees where they feel more comfortable', like those with hollow trunks that are abundant in forests (*comunario*, San Juan). Trees are a common reference for people to locate beehives and predict the quality of the honey: 'there is a darker honey by the river bank, from the *Paratodo* [*Handroanthus abayoy*] flowers…' (*comunario*, Cordillera); "… the other day they collected from the *Curupaú* [*Anadenanthera colubrina*]" (*comunario*, San Juan).

Such intimate people-bees-trees relations closely follow the dry forests' seasonality. The patterns of rain and flowering are key in the synchronization of wild honey-economies (Roubik et al., 2005). Although not everyone agrees on the exact seasons, in San Juan people observe bees 'working hard' in the spring (dry season) to take advantage of the flowering, until when the rains slowly start to fall around the end of August. With the increasing humidity towards December, they start producing and storing honey, so that the peak production arrives by February–March, right before the start of the dry season. However, some people observe that long and more intense droughts, which they relate to deforestation, are affecting bees and reducing the amount of honey they can produce. Therefore, in both communities, people worry about the declining availability of honey, which depends on the future of their forests.

People often experience forests as a unique source of general abundance in their communities. Quotidian encounters with this abundance can generate a sense of collective ownership and responsibility, and satisfaction for having the possibility of self-sufficiency in sources for timber, food, fiber, and medicine, including wild honey. In the words of a community leader, 'the forest is like our supermarket'; a statement we also heard in other conversations. Forest-related economies entail instrumental relationships supporting territorial bonds.

Wild bees and their honey are part of people's experience of abundance. Stories of encounters with bees regularly spread in the community and are part of everyday life. In San Juan, most interviewees recall collecting large amounts of wild honey at some point of their lives. This abundance is just a memory in the case of Cordillera: 'when we first arrived here there was a lot of honey. We used to collect a lot, 10 L, 20 L' (community pioneer, Cordillera). Nowadays, wild honey is less of a primary reason to enter the forest, and more of an occasional practice alongside timber extraction.

Honey collection reveals synchronizations of habitual forest uses and unpredictable encounters in which humans and bees each have agency. Loggers and hunters know best about the locations of *picos* (beehives) in the forests. During their workdays, encountering wild bees by chance might give an opportunity to collect wild honey: 'you don't search for honey, you find it' (community member, San Juan). Sometimes, loggers casually hear the bees, or find beehives accidently after they have cut down a tree. Finding the *picos* involves tracing the buzzing, noticing the changes in its intensity while identifying the trees where hives are more likely located.

> When you're brushing [clearing around the tree before cutting it down] you hear the swarming sound 'zzzz'; if it is inside the trunk, it makes a stronger rumbling (…). The *picos* can be seen high up (…) but usually one bends down because if you look up you can hurt yourself with the *machete* (…); they're easier to find below. Then you identify it, and on another date, in a better time, you come back [to collect]. (*comunario*, San Juan)

At times, unexpected events unfold after encounters with wild bees. In one conversation, someone told us how, because of fighting with some bees, he almost created an uncontrollable fire, but in the end managed to extinguish it:

> … I had knocked one tree down (…). When I approached to clean it up with the chainsaw, the bee swarm came at me on a rampage (…) cutting and biting my hair. They can make you bald, like scissors (…). I grabbed a stick, put gasoline and lit it on fire [to burn the beehive], and the burnt oil splashed on the ground (…) it was 2pm, the heat was strong (…) the fire wanted to spread (…). It was all dry; dry leaves burn faster than paper (…). Others came to help; we circled the fire with the little water we had. (*comunario*, San Juan)

Encountering wild bees triggers a variety of reactions. Loggers and hunters normally do not carry materials to collect the honey, and consequently they have to remember the location and come back later, better prepared. 'I found a *pico*' is a common expression to invite others, especially family members, to help with collecting and to share the honey, although not everyone is eager to participate. Bees' different territorial behaviors are sometimes frightening, and sometimes charismatic:

> Occasionally, people avoid cutting a tree because they see it hosts a *pico*, or because they fear the bees. The 'extranjeras' [*Apis melífera*; a non-native feral species in the area] are the most feared, as well as the 'cortapelo' [i.e., 'hair-cutting', (*Scaptotrigona cf. depilis*)]. While the 'señoritas' [i.e., 'little ladies', *Tetragonisca fiebrigi*] do not bite. [When frightened] people prefer to leave the tree alone. (*comuniario*, San Juan)

The reactions can include both confrontations and a sense of familiarity: 'bees, as tiny as they are, make themselves respected. They are better organized than human beings.' Common descriptions of bees include adjectives like "tame", "rough", "angry", and "bad", which reflect the character of the encounters. Additionally, people are familiar with the bees' usual reactions to human presence: 'they [*Apis melifera* bees] must be angry now (…) because they have honey, it has not been collected yet, they will defend it' (*comunario*, Cordillera). Their ability to defend themselves often succeeds in stopping the collection. For instance, during an interview in which we were helping a *comunaria* to collect honey, we had to stop collecting and leave because of the bees' intense biting in defense of their hive:

> They're bad. The ones already outside [of the hive] are the ones that will make us cry (…). They're biting me (…) we should leave it for later (…). Look! they're many, they are already in my eyes (…). I told you, they bite (…); they are still in my head thundering (…). Let's go, it's late, we have to get home… [with disappointment] I already wanted to taste the honey… (*comunaria*, San Juan).

Not everyone interacts with the bees in the same way, and their practices of collecting wild honey depend on the behavior they expect from bees. Most people keep secrecy about the strategies they use when approaching bees. Some conversations in San Juan involved rumors about people silently asking the bees for permission, others who prefer collecting at night, those who know how to point the axe in a way that repels the bees, or someone who collects honey without wearing any clothes and does not get bitten. Such different practices and gestures reflect the intimate and personalized experiences that people form with honey collecting over the course of their life experiences, which are bound up in their experiences with forests.

Often, the different steps leading to a successful honey collection are filled with memories and life-stories, which add emotional weight to these moments:

> When you cut a tree, you can feel your heart bursting out of your chest (…) your lips get dry, you're drenched in sweat, and the bees come to you (…) they want to get into your ear (…). I think sometimes, why did I come to the forest to suffer? I remember my uncle's death; he invited me to form a community [referring to coming to live in San Juan], and if I were leaving, I wouldn't be honoring him (…) he died for something he wanted, to have a piece of land to be able to work and live on. (*comunario* who first arrived as an Andean settler, San Juan).

The intertwining of honey collecting with these intimate and embodied experiences of territorial belonging, physical discomfort, and family history shape honey-economies; the meanings and the ways through which these encounters take place are as important as collecting honey itself. Further, these meaningful relations spread beyond forests, as honey-economies also take place in other spaces.

4.2. Harvesting honey amid farming economies

Honey collection also happens in the spaces now dominated by farming in the agricultural plots assigned to each family within the collective lands of San Juan and Cordillera. In these spaces, it resembles a form of product harvesting, with people expressing ownership over the beehives with the expression 'I have a *pico*'. In San Juan, some trees are left standing temporarily in the *chacos* (agricultural plots) and cattle ranches for the plot owners' own management reasons, including having shade, keeping timber reserves and windbreakers, protecting water sources - or harvesting honey, when these trees house *picos*. Thus, encounters with bees are less accidental than in forests. Some people like to take the time to walk around and locate the hives, marking them to wait for a good time to harvest. They look especially for those hives containing their favorite honey. People feel more control over the bees inside their farming plots, but their agency is sometimes challenged by other beings during honey harvesting in the *chacos*.

Land clearing and honey harvesting can trigger unpredictable events, and their outcomes depend on multiple animals' reactions and interactions. To survive, bees have to find new places to rebuild their *picos* in windbreaks, pieces of wood, felled trunks, or other trees. This renews the possibilities of human-bee encounters and the reproduction of honey-economies. But humans are not the only ones interested in honey: once they cut the tree, they have to harvest quickly before other animals do. Usually, ants are the first to appear, followed by *meleros* (*Eira barbara;* a type of weasel). Describing an acquaintance, one interviewee related:

> He went once to harvest, but he had a vice: he needed to smoke [smoking tobacco]. He looked for his pipe but it wasn't there. He left the *pico* uncovered and went home to bring the pipe. He came back and there was no more honey, the *melero* had taken it all (*comunario*, San Juan).

By attracting multiple species, honey-economies generate new encounters, synchronizing different life-forms and drawing them into life-sustaining territorial relationships. For example, in Cordillera, bees have to adapt to trees' scarcity in the radically transformed landscapes of large-scale monocrops. There, people described how bees (especially *Apis mellifera*) synchronize with the temporalities of the soybean and sunflower, visiting their flowers according to crop cycles.

> In September, in spring [dry season], we harvest honey from pure trees. After that, when the soybean flowering ends, in March, we harvest the soybean honey again. Then we harvest in August the sunflower honey (*comunario*, Cordillera).

The temporalities of the planting season and flowering mark the synchronization of bees and crops, resulting in specific honey characteristics. For example, some people affirm that the sunflower honey tastes better. However, the intensive use of agrochemical inputs disturbs bees' relationship with these flowers and affects the quality of the honey.

> They know the dangers, they smell it (…) when there are pesticides (…) it affects them (…). They detect all that (…) and they don't come to the plants until the effect passes after three days, they come back. But some still get in contact and die… (*comunario*, Cordillera).

Frontier dynamics, with expanding large-scale monocrops, change the food resources available to bees (Benavides-Frías et.al. (In preparation)) by interrupting their relation to trees, due to deforestation, and forcing them to pollinate the monocultures loaded with pesticides. 'My poor bees, with time they will be all gone. They are displaced from their homes [referring to forests], where will they go?' (*comunaria*, Cordillera). Yet, as we describe below, not even in monocrop-dominated landscapes does bees' agency disappear completely.

People notice that bees change their usual trajectories due to the monotony of these farming landscapes. Similar to how the agrarian commodity frontier pushes people to find jobs far away from their communities, bees need to fly longer distances in search for food and water. Encounters become more frequent where people do not expect them, such as in pastures and village areas. This is especially true in Cordillera, where large monocrops surround the villages. There, people react to bees depending on their perceived charisma or hostility. 'People are scared of bees; they've been bitten (…). Those bees used to go to the houses and bite people.' (*Comunario*, Cordillera). In contrast, some species, like the *señoritas,* are considered tame and, therefore, they are welcomed as domestic companions. Some people see opportunities to help the bees and benefit from them, integrating them to household economies: 'the poor bees, they have to work arduously to bring food (…) we have to let a place grow [for them], some forest, see? And there you can put little boxes [to harvest honey], everything is possible' (*comunario*, Cordillera). Bees can reassemble their hives in different places, such as light poles, wood pieces and boxes, or house roofs. Thanks to these abilities, they synchronize with the village's daily life, and new economies of beekeeping emerge.

4.3. Beekeeping in village and household economies

Beekeeping arises from the especially deep fractures left by deforestation in Cordillera. It involves the capture and breeding of wild bees in human-made artifacts located mainly in patios, in home gardens, or in windbreaks and forest patches. Beekeeping synchronizes the life-trajectories of bees and humans, through the abilities to adapt to territorial changes, the opportunities of using honey as a complement for household economies especially led by women, a sense of care and empathy for displaced bees, and the economic struggles of landless *comunarios*.

Displaced wild bees entangle with humans by colonizing host hive-boxes, firewood, or scraps from carpentry work. Our conversations in Cordillera describe the processes of 'catching' wild bees, mainly from remaining trees, entailing not just domestication but also negotiation:

> They have become accustomed, they adapt, and they know this is their home (…). If we move the boxes somewhere else, they are still going to come here looking for them. They get mad, scatter and leave. So, where you catch them, that's where you have to put the box (*comunario*, Cordillera).

Not all bees adapt. People perceive a loss of diversity. Generally, only the *extranjeras* and a few *señoritas* occupy the host boxes.

> There used to be a lot of bees and honey (…). Now, they [people] have to make it, to raise the honey ['*criar miel*']. There are not so many bees now; they have to be in boxes. There are not so many plants or trees together, 'forests', as you call them. Far away, there must be some. Bees can fly and find flowers five km around, my grandpa told me (*comunaria*, Cordillera).

Boxes are becoming the only home option for bees, according to women beekeepers in Cordillera. Ironically, beekeepers regularly cut down trees hosting hives to catch the bees, knowing that those trees will be cut anyway soon and the bees could be left homeless. However, the relationship of bees with trees is irreplaceable and 'bees feel safer living in trees' (*Comunaria*, Cordillera). In the boxes, they are more dependent of human care, as people feed and help them fight against plagues:

> … in the trees, they protect themselves with the propolis against insects or disease (…). In the boxes, we put oil so that *sepe* ants (*Atta*

spp.) and frogs do not climb up (…). *Turiros* [termites] destroy the boxes fast. Also, moths. So, we paint the boxes and burn *tajibo* (*Handroanthus chrysanthus*), *cedrón* (*Cymbopogon citratus*), *manzanilla* (*Matricaria chamomilla*) (…). In the box, we also have to open it to ventilate and refrigerate. If it's too hot, they leave (…). (*Comunaria*, Cordillera).

Hive-boxes represent new life conditions that beekeepers create for increasingly dependent bees, motivated by a cultural identification with beekeeping and the usefulness of honey. Some women suggest that bees need to make less effort in the boxes because 'in the trees they have to make their own wax, whereas in the boxes we buy them laminated wax, so it's easier for them' (*comunario*, Cordillera); '[bees] become lazy and die if you don't feed them, like farm chickens. The forest ones are stronger' (*comunaria*, Cordillera). Nevertheless, there is still the impression that bees are organized and hard-workers: 'I tell them, you will be brave, you are going to make honey (…). They are working all the time (…). They also make money for us…' (*comunaria*, Cordillera). Honey is a key element triggering a human sense of care towards bees' work, and stimulating the formation of honey-economies in the context of deforestation.

Beekeeping arises from the synchronization of bees' displacement from forests, women's need for monetary income to sustain their families, and many beekeepers' quests for land. However, even where almost no forest is left, the economies of honey depend on the bees-trees-plants relationship, which needs enough space to flourish. Therefore, the relationship to the land is fundamental. In Cordillera, the quest for land is more pressing due to spatial saturation: 'we have thought a lot of honey [as an opportunity to get additional income], but it won't work here due to the lack of space' (leader of landless residents, Cordillera). For women's beekeepers' organization, the 'honey business' requires owning land, trees and timber, so that carpenters can build the boxes with wood from their own forests, beekeepers can place the boxes and catch the bees, and bees can benefit from the flowering trees and plants. Some women trust that beekeeping can provide them an independent income, especially as its medicinal properties are increasingly valued in the markets. Hence, honey-economies also take part in land conflicts, by becoming a reason for women and their families to lead demands for land access or to look for new land elsewhere. 'If they don't have trees, what are they going to eat? (…) Bees need land. And we don't want only 20 little boxes, 1 ha is not enough' (*comunaria*, Cordillera).

In Cordillera, beekeeping participates in ongoing conflicts over the increased land-scarcity in the Chiquitanía due to the territorial occupation by commodity agriculture. By assembling landless community members led by women, with carpenters, honey, trees, plants, wild bees and remaining patches of forests and trees, beekeeping economies hold potential to mend some broken territorial bounds, amidst the many fractures produced by the forces of frontier expansion. Synchronizations of bees' and humans' trajectories provide opportunities to strengthen and create territorial entanglements out of the ruins of deforestation and agrarian extractivism.

5. Synchronizations of diverse economies can mend territorial relations in agrarian commodity frontiers

Our research depicted Chiquitanía's agrarian commodity frontier as an expansive force inseparable from the trajectories of capitalism's globalized markets and politics in Bolivia. Yet, we also highlighted the motley character of the frontier (Jasser et al., 2022; Rivera Cusicanqui, 2018), involving lived experiences and simultaneous spatio-temporal processes, visions which contrast with the over-simplified characterizations of the frontier as a single, consistent entity expanding steadily. In the following, we will discuss how paying attention to the synchronizations of honey-economies in our case studies allows us to think beyond fixed frontier representations and notice the motley mix that exists at the fractures of agrarian extractivism. Such a mix reveals persistent unruly trajectories (Tsing, 2021) and provides opportunities to identify unexpected reactions (McMichael, 2023; Moore, 2023) to the violence of agrarian extractivism.

5.1. Synchronizations arise out of the fractures of the agrarian commodity frontier

In the Chiquitanía, as illustrated with the stories of San Juan and Cordillera, fractures form when diverse livelihoods forcibly align with agrarian extractivism, as people struggle to make their living. The diverse trajectories of Indigenous territories coincide in stories of deforestation and uncontrolled timber extraction. Narrations of loss and lack of alternatives recall Anna Tsing's stories of despair and destruction that grow out of capitalism's proliferation, accumulation and the resulting "conditions of terror in which agency is sometimes formed" (Tsing, 2005, 26). In our research, two simultaneous processes occur at the Chiquitanía's frontier: the fractures of livelihoods, and the synchronizations of people-bees' trajectories forming honey-economies within different territorial relations.

In the first process, agrarian extractivism turns diverse territorial relations into resources for capital accumulation, through the appropriation of human and non-human work (Moore, 2023). For instance, in Cordillera, land renting has been a financial strategy of capital owners to access cheap land and to control its output produced by the work of *comunarios*. It is the foundation of an exploitative system of both human and non-human work (including bees' pollination), resulting in almost total deforestation, soil depletion, biodiversity annihilation, and economic and cultural collapse. In San Juan, illegal and uncontrolled logging is turning forests into cheap timber resources finding their way through markets, hindering the economies that have existed for generations under the forest canopy, such as the selective extraction of timber, hunting, and honey collection. Both cases reflect regional and global dynamics of accumulation, where the dominant agents of frontier expansion profit from the territorial diversity produced by more-than-human entanglements that they do not totally control (Tsing, 2021).

The increase of intensive and indiscriminate logging hinders other forest uses, including honey-economies. In San Juan, a slower pace of selective timber extraction makes it still possible for people to notice the presence of bees in the forests and croplands, their behaviors and life-trajectories. As expressed in people's narratives, by encountering bees and deciding to collect their honey, people engage in many relations, inviting others to join the collection, observing the interactions of other species with bees and honey, or sharing and exchanging the honey in their families and communities. The intersection of honey-economies with other everyday practices contributes to securing livelihoods. Yet, people also notice the decline in honey production as droughts seem to last longer due to deforestation in the region. In Cordillera, frenetic extractivism fractured forest economies by depleting biodiversity and expelling bees and other species out of their habitats. Therefore, most human-bee encounters take place in croplands, where bees have to adapt to the monotony of soybean landscapes, or in villages, where new types of encounters and honey-economies are emerging. While frontier dynamics are leading to biodiversity loss and fractured livelihoods in both communities, such simultaneous events are lived differently.

In the second process, honey-economies persist and emerge from the trajectories of people and bees influenced by frontier dynamics across forests, farms, and villages. Yet, their synchronizations show that agrarian extractivism does not determine all territorial relations. Honey-economies and the encounters with bees activate people's sense of familiarity and belonging to their territory, through their capacity to notice the intersections of their own livelihoods with the trajectories of multiple species, including insects, other animals, and plants. This sparks critical reflections about mutual affections, the problems of other economies such as logging, hunting, or farming, and the wider frontier dynamics including the impacts of extractivism on interconnected lives.

Moreover, people's narratives show persisting interactions and emerging interdependencies due to new synchronizations that form when bees move across territorial spaces. Particularly, beekeeping within households reproduces everyday relationships and, especially in Cordillera, creates new intersections between honey-economies and people's struggles for securing their livelihoods, including the fight for land access. Such synchronizations provide opportunities for people to critically think about their everyday lives in relation to frontier dynamics and to territorial relations, and to create a sense of agency amidst limited alternatives.

5.2. Mending territorial relations through diverse economies

Considering synchronizations can help to think beyond fixed frontier representations and to acknowledge the multiplicity of territorial processes and struggles (Ioris, 2023). Particularly, lived experiences can represent diverse economies grounded in relations that are usually silenced by dominant extractivist policies and narratives (Tsing et al., 2024; Gibson-Graham and Dombroski, 2020). Depicting agrarian commodity frontiers as motley territories (Jasser et al., 2022) allows for suggesting that their trajectories are not set in stone. This aligns with Segarra et al.'s (2024, 22) call to critically combine remote sensing tools with situated narratives to support demands for environmental justice, instead of merely "gazing at the environmental devastation". Land-use changes, especially deforestation, can be sensed remotely, but the heterogeneous processes occurring inside each layer and pixel can tell different stories. Extractivism produces territorial fractures and tends towards homogenization, but heterogeneous relations do not completely disappear from frontier dynamics. Our results suggest that, while the devastation can appear overwhelming, there are other events occurring simultaneously and moving in different directions that deserve to be noticed.

In our study, honey-economies show the reactiveness and expressiveness of people-bee relationships in face of the fractures caused by deforestation and logging. They represent different but simultaneous temporalities in friction (Phillips, 2020). Cordillera has reached a state of total deforestation, and it seems to have established extractivism as its main economic model. However, honey-economies represent women beekeepers' attempts to find new trajectories allowing them to make a living in alliance with bees. In San Juan, the progression of the commodity frontier is evident in the fracturing of livelihoods, even though the community is still mainly covered by forest. Honey-economies reflect the persistence of people's connection with forests and land beyond extractivist motivations. In both cases, assuming that frontier dynamics are reducible to observations of changing land-covers and deforestation rates can be misleading. Therefore, looking at diverse economies is key to understanding how agencies form out of more-than-human coordinations (Miller, 2020) in reaction to frontier dynamics, and to acknowledge the territorial heterogeneity that they enact (Jasser et al., 2022).

The compelling evidence of the social-environmental devastation in Eastern Bolivia (Müller et al., 2024; Quintanilla et al., 2023; Vos et al., 2020) underlines the urgent need to counteract the cycles of territorial colonization and appropriation (Czaplicki, 2024; Morales Escoffier, 2024), and to valorize frontier dynamics compatible with the flourishing of multiple life forms. In the Chiquitanía, political struggles are heating up in response to the contradictions of a political and economic system that has renewed agrarian extractivism (Morales Escoffier, 2024). The concerns over the territorial devastation brought about by extractivism in Cordillera and San Juan echo the regional grass-root reactions to the environmental crisis (Cambará, 2024; Ruilowa, 2024). Research on diverse economies and their unruly synchronizations can help to identify already existing practices that could offer alternatives to agrarian extractivism.

Research on diverse economies at agrarian commodity frontiers can provide insights on how more-than-human entanglements form at the fractures caused by extractivism, and how they can produce new territorial bonds (de la Bellacasa, 2011). In Latin America, several scholars have drawn attention to the need for researching and mobilizing alternative models based on non-extractivist relations (Gudynas, 2023). A close dialogue with Indigenous people's lived experiences, and their agencies and struggles for self-determination is crucial for thinking non-extractivist futures (McKay, 2020; Tilzey, 2021; Ulloa, 2017; Veltmeyer and Ezquerro-Cañete, 2023). Indigenous people's economies are not exempt from contradictions (Rolando and Sarmiento Barletti, 2024) or disentangled from extractivist models. Nevertheless, they also rely on everyday practices conceived in close relation to non-human beings (Ulloa, 2021, 2023), combining material and symbolic dimensions, and "processes of organization and resistance" (Haesbaert and Mason-Deese, 2020, 260–65) that can challenge the homogenizing logics of agrarian extractivism and globalized markets (Svampa, 2015).

The cases described in this paper suggest that extractivism at the agrarian commodity frontiers is not the end of the story. Its fractures in a context of devastation unveil its "weak links" (Moore, 2022, 128), which can become opportunities for territorial alternatives based on already existing and reactive diverse economies.

CRediT authorship contribution statement

Stefan Ortiz-Przychodzka: Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Alder Keleman-Saxena:** Writing – review & editing, Writing – original draft, Conceptualization. **Camila Benavides-Frías:** Writing – review & editing, Investigation. **Isabel Díaz-Reviriego:** Writing – review & editing. **Jan Hanspach:** Writing – review & editing, Supervision, Funding acquisition.

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Data availability

The data that has been used is confidential.

References

Adler, Marcia, Escóbar-Márquez, Luciana, Solis-Soto, Maria Teresa, Pinto, Carlos F., 2023. Stingless bees: uses and management by meliponiculturist women in the chaco region of Bolivia. J. Ethnobiol. Ethnomed. 19 (1), 5. https://doi.org/10.1186/s13002-022-00574-0.

Andreucci, Diego, Radhuber, Isabella M., Chávez, Marxa, Jasser, Marie, 2023. Sovereignty against extractivism. In: Neoextractivism and Territorial Disputes in

Latin America. Routledge, London, pp. 207–222. https://doi.org/10.4324/9781003267461-14.
APCOB, 2016. Ya No queda nada, el jichi Se ha Ido. Cosmovisión. Conocimientos y Prácticas Del Pueblo Chiquitano En Relación Al Cambio Climático. Santa Cruz de la Sierra.
Ardaya, Nostas, Mercedes, Sanabria, Carmen Elena, 2010. In: Nuestro Propio Caminar. Mujeres En La Provincia Guarayos: Género Y Economía, first ed. Santa Cruz de la Sierra: CIPCA.
Arrien, Mario, 2008. Sistemas de Subsistencia y Cosmovisión de Los Chiquitanos. https://www.jcu.edu.au/language-and-culture-research-centre/people-and-projects/people/alternative-staff-profiles/mario-arrien.
Arrien, Mario, Viana Chuvé, Antonio, 2007. Saberes Y Conocimientos Del Pueblo Monkox. Santa Cruz de la Sierra.
Balza Alargón, Roberto, 2001. Tierra, Territorio Y Territorialidad Indígena. Santa Cruz de la Sierra, APCOB, SNV, IWGIA.
Batubara, Bosman, 2021. Swyngedouw's Puzzle: Surplus-value production in Socionature. Hum. Geogr. 14 (2), 292–295. https://doi.org/10.1177/19427786211012663.
la Bellacasa, Maria Puig de, 2011. Matters of care in Technoscience: assembling Neglected things. Soc. Stud. Sci. 41 (1), 85–106. https://doi.org/10.1177/0306312710380301.
Benavides-Frias, Camila, Paula Saravia Rodriguez, Sun, Ping, Benra, Felipe, Morón Aguilar, Daniela, Jan, Hanspach, n.d.(in preparation). "Bind Together: Resource Availability and Bee Flower Visits in Mismatching Agroecosystems of Bolivian Chiquitanía.
Berman-Arévalo, Eloísa, Ojeda, Diana, 2020. Ordinary Geographies: care, violence, and agrarian extractivism in 'Post-Conflict' Colombia. Antipode 52 (6), 1583–1602. https://doi.org/10.1111/anti.12667.
Borras, Saturnino M., Franco, Jennifer C., 2024. Land rush. J. Peasant Stud. 1–16. https://doi.org/10.1080/03066150.2024.2317961. March.
Cambará, Limber, 2024. Indígenas Chiquitanos Inician Bloqueo Indefinido En La Carretera Bioceánica. *El Deber*, October 30, 2024. Indígenas chiquitanos inician bloqueo indefinido en la carretera bioceánica.
Cely-Santos, Marcela, 2021. Más Que Miel: Generalidades de Las Abejas y Otros Polinizadores, Alrededor Del Vínculo Entre Tensiones Socioecológicas La Agricultura y La Alimentación En Colombia. In: Quiroga, Catalina, Uscátegui-Ramírez, Olmo (Eds.), Conflictos Socioambientales En El Sur Global. Respuestas y Construcciones Locales de Otras Naturalezas, vol. 1. Corporación Universitaria Minuto de Dios, Bogotá, pp. 175–213.
Chévez, Estrella, Porter-Bolland, Luciana, García-Frapolli, Eduardo, Landgrave, Rosario, Revollo-Fernández, Daniel, 2023. Bee landscape relations in changing contexts, implications for stingless Bee management. Reg. Environ. Change 23 (3), 106. https://doi.org/10.1007/s10113-023-02093-4.
CICOL, 2019. "Plan de Gestión Territorial Comunitario. Plan de Vida de La Nación Monkoxi Besiro de Lomerío (2020-2024).". Santa Cruz de la Sierra.
Cole, Alastair, Fontana, Lorenza, Hirzel, Max, Johnston, Caleb, Miramonti, Angelo, 2023. On burning ground: Theatre of the Oppressed and ecological crisis in Bolivia. Cult. Geogr. https://doi.org/10.1177/14744740231154259. February, 147447402311542.
Colque, Gonzalo, Tinta, Efraín, Salas, Gustavo, Moy, Agustín, Alcons, Fernando, 2021. Despojo de Tierras de Comunidades Por El Agronegocio Boliviano. Santa Cruz de la Sierra.
Colque, Gonzalo, Tinta, Efraín, Alcons, Fernando, Salas, Gustavo, 2022. Deforestación 2016-2021. El Pragmatismo Irresponsable de La 'Agenda Patriótica 2025.'". Santa Cruz de la Sierra.
Czaplicki, Stasiek, 2024. Agronegocio Sin Frenos: Bolivia Rumbo Al Desastre Ecológico, vol 2024. Revista Nómadas.
Czaplicki, Cabezas, Stanislaw, 2024. Las Finanzas Grises Del Agronegocio En Bolivia Y Su Rol En La Deforestación, first ed. La Paz, Bolivia: Actionaid.
Czaplicki-Cabezas, Stanislaw, 2023. The Hidden crisis of deforestation in Bolivia deforestation is increasing in Bolivia. Trase Insights 2023. https://insights.trase.earth/insights/the-hidden-crisis-of-deforestation-in-bolivia/.
Delgado, Yorlis Luna, Maya, Elda Miriam Aldasoro, Borrel, Eric Vides, Morales, Helda, Rosset, Peter, 2022. Crianza de Abejas Nativas: Una Pedagogía Agroecológica Con Raíces. Revista Brasileira de Educação Do Campo 1–27. https://doi.org/10.20873/uft.rbec.e14508.
Eichler, Jessika, 2019. Neo-extractivist Controversies in Bolivia: indigenous perspectives on global Norms. Int. J. Law Context 15 (1), 88–102. https://doi.org/10.1017/S1744552318000150.
Fundación, Tierra, 2021. "Contextualización y Caracterización Socioterritorial de La Chiquitanía.". Santa Cruz de la Sierra.
Fundación, Tierra, 2024. Los Cultivos Genéticamente Modificados No Contribuirán a Resolver La Crisis Económica de Bolivia. Fundación TIERRA 2024.
Gibson-Graham, J.K., Kelly, Dombroski, 2020. Introduction to the Handbook of diverse economies: Inventory as ethical Intervention. In: The Handbook of Diverse Economies, first ed. Edward Elgar Publishing, pp. 1–24.
Gudynas, Eduardo, 2023. Post-extractivist transitions. In: From Extractivism to Sustainability. Routledge, London, pp. 221–240. https://doi.org/10.4324/9781003301981-18.
Haas, Francesca, 2019. "Naturaleza, Agricultura Y 'Progreso'. Perspectivas Indígenas Guaraní En El Centro Del Capitalismo Agroindustrial Boliviano.".
Haas, Francesca, 2023. La Conversión agroindustrial Como Fractura cultural. Reflexiones Sobre La Memoria de La Naturaleza En La Comunidad Guaraní 16 de Marzo En Bolivia. *L'Uomo* XIII, pp. 127–160.
Haesbaert, Rogério, Mason-Deese, Liz, 2020. Territory/ies from a Latin American perspective. J. Lat. Am. Geogr. 19 (1), 258–268. https://doi.org/10.1353/lag.2020.0005.
Haraway, Donna J., 2016. Staying with the Trouble: Making Kin in the Chthulucene, first ed. Duke University Press.
Inturias, Mirna, von Stosch, Kristina, Baldelomar, Henry, Rodríguez, Iokiñe, 2019. Bolivia. Desafíos Socioambientales En las Tierras Bajas. In: Santa Cruz de la Sierra: Instituto de Investigación Científica, first ed.
Ioris, Antonio A.R., 2023. Making the Amazon a frontier: where less space is more. Distinktion: Journal of Social Theory 24 (1), 64–86. https://doi.org/10.1080/1600910X.2021.1884579.
Jasser, Marie Theresa, Radhuber, Isabella M., Inturias, Mirna, 2022. Motley territories in a Plurinational state: forest fires in the Bolivian Chiquitanía. Third World Thematics: A TWQ Journal 1–22. https://doi.org/10.1080/23802014.2022.2146182, 00 (00).
Koch, Larissa, Gorris, Philipp, Pahl-Wostl, Claudia, 2021. Narratives, narrations and social structure in environmental governance. Glob. Environ. Change 69 (July), 102317. https://doi.org/10.1016/j.gloenvcha.2021.102317.
Kröger, Markus, 2021. Frontiers of existence. Suomen Antropologi J. Finn. Anthropol. Soc. 46 (1), 77–96. https://doi.org/10.30676/jfas.v46i1.99900.
Lastarria-Cornhiel, Susana, Barahona, Zulema, Orti, Leticia, 2008. The women of Isoso: livelihoods, governance, and natural resources in the gran chaco, Bolivia. Wildlife Conservation Society.
Li, Tania Murray, 2014. *Land's End. Capitalist Relations on an Indigenous Frontier*. 1st, 2. Duke University Press. https://doi.org/10.2307/j.ctv2tsxm2c.18.
Llanque, Aymara, Mamani, Marta Irene, 2024. From Enchanted Alienation to transformative responses: agroindustrial MIPs and local reactions towards reproduction of life in Bolivia. In: Haller, Tobias, Weissman, Samuel (Eds.), Disenchanted Modernities - Mega-Infrastructure Projects, Socio-Ecological Changes and Local Responses. Action Anthropology/Aktionsethnologie.
Maillard, Oswaldo, Pinto-Herrera, Carla, Vides-Almonacid, Roberto, Pozo, Paola, Belaunde, Claudia, Mielich, Nicolas, Azurduy, Huascar, Cuellar, Rosa Leny, 2024. Public policies and social actions to prevent the loss of the Chiquitano dry forest. Sustainability 16 (3), 969. https://doi.org/10.3390/su16030969.
Maya, Aldasoro, Miriam, Elda, Robles, Ulises Rodríguez, Gutiérrez, María Luisa Martínez, Chan Mutul, Guelmy A., López, Teresita Avilez, Morales, Helda, Ferguson, Bruce G., Rivas, Jorge A. Mérida, 2023. Stingless Bee keeping: Biocultural conservation and Agroecological Education. Front. Sustain. Food Syst. 6 (January). https://doi.org/10.3389/fsufs.2022.1081400.
McKay, Ben M., 2018. Extractivismo Agrario: Dinámicas de Poder, Acumulación y Exclusión En Bolivia. TIERRA, La Paz.
McKay, Ben M., 2018. The politics of agrarian change in Bolivia's Soy Complex. Journal of Agrarian Change 18 (2), 406–424. https://doi.org/10.1111/joac.12240.
McKay, Ben M., 2020. Food Sovereignty and Neo-extractivism: limits and possibilities of an alternative Development model. Globalizations 17 (8), 1386–1404. https://doi.org/10.1080/14747731.2019.1691798.
McKay, Ben M., Gonzalo, Colque, 2021. Populism and its Authoritarian Tendencies: the politics of division in Bolivia. Lat. Am. Perspect. XX (Xxx), 1–17. https://doi.org/10.1177/0094582X211052980.
McMichael, Philip, 2023. Updating Karl Polanyi's 'Double movement' for critical agrarian studies. J. Peasant Stud. 1–22. https://doi.org/10.1080/03066150.2023.2219978. June.
McNelly, Angus, 2022. Harnessing the Storm: Searching for constitutive moments and a politics of Ch'ixi after the Pink Tide. Alternautas 9 (1), 98–128. https://doi.org/10.31273/an.v9i1.1157.
Meyfroidt, Patrick, Abeygunawardane, Dilini, Baumann, Matthias, Bey, Adia, Buchadas, Ana, Chiarella, Cristina, Junquera, Victoria, et al., 2024. Explaining the emergence of land-use frontiers. R. Soc. Open Sci. 11 (7), 2402–12487. https://doi.org/10.1098/rsos.240295.
Miller, Ethan, 2020. More-than-Human agency: from the human Economy to ecological livelihoods. In: The Handbook of Diverse Economies. Edward Elgar Publishing, pp. 402–410. https://doi.org/10.4337/9781788119962.00057.
Moore, Jason W., 2015. Capitalism in the Web of Life. Ecology and the Accumulation of Capital. Verso, London.
Moore, Jason W., 2022. Anthropocene, Capitalocene & the Flight from World History: Dialectical Universalism & the Geographies of Class Power in the Capitalist World-Ecology, 1492-2022. *Nordia Geographical Publications*, April, pp. 1–24. https://doi.org/10.30671/nordia.116148.
Moore, Jason W., 2023. Waste in the limits to capital: how capitalism Lays Waste to the Web of life, and why it Can't stop. Emancipations: A Journal of Critical Social Analysis 2 (1), 1–45. Article 4.
Morales Escoffier, Natasha, 2024. A Fuego Y Mercurio. Crisis Ecológica Y Desigualdades En Bolivia, first ed. Oxfam, La Paz. Bolivia.
Morón, Daniela, Adler, Marcia, Justiniano, Hermes, 2023. Abejas Nativas de Un Paisaje Productivo Representativo de La Chiquitanía. In: Azurduy, Huáscar (Ed.), Guía Ilustrada. Santa Cruz de la Sierra: Museo de Historia Natural "Noel Kempff Mercado.
Müller, Robert, Montero, Juan Carlos, Mariaca, Gustavo, 2024. Causas, Actores y Dinámicas de La Deforestación En Bolivia 2010-2022. CELA, La Paz, Bolivia.
Ortiz-Przychodzka, Stefan, Benavides-Frías, Camila, Raymond, Christopher M., Díaz-Reviriego, Isabel, Jan, Hanspach, 2023. Rethinking economic practices and values as assemblages of more-than-human relations. Ecol. Econ. 211 (May), 107866. https://doi.org/10.1016/j.ecolecon.2023.107866.
de la Ossa, Serje, Margarita, 2011. El Revés de La Nación. Revista de Estudios de Juventud. https://dialnet.unirioja.es/servlet/articulo?codigo=3256011&info=resumen&idioma=SPA.

de la Ossa, Serje, Margarita, 2017. Fronteras y Periferias En La Historia Del Capitalismo: El Caso de América Latina. Rev. Geogr. Norte Gd. 48 (66), 33–48. https://doi.org/10.4067/S0718-34022017000100003.
Padilla Raudales, Denis, 2022. Comunidades de Abejas (Hymenoptera: Apidae) En Ambientes Contrastantes de Un Paisaje de La Chiquitanía. Santa Cruz, Bolivia.
Phillips, Catherine, 2020. Telling times: more-than-human temporalities in beekeeping. Geoforum 108 (January), 315–324. https://doi.org/10.1016/j.geoforum.2019.08.018.
Pratzer, Marie, Meyfroidt, Patrick, Antongiovanni, Marina, Aragon, Roxana, Baldi, Germán, Cabezas, Stasiek Czaplicki, de la Vega-Leinert, Cristina A., et al., 2024. An actor-Centered, scalable land system Typology for Addressing biodiversity loss in the World's tropical dry Woodlands. Glob. Environ. Change 86 (April), 102849. https://doi.org/10.1016/j.gloenvcha.2024.102849.
Quijano, Olver, 2012. Ecosimías. Visiones y Prácticas de Diferencia Económico/Cultural En Contextos de Multiplicidad. Universidad del Cauca, Popayán.
Quintanilla, Marlene, Cuéllar, Saúl, Camargo, Rodney, Espinoza, Sara, Tancara, Sara, Char, Marcelo, Mollinedo, Eva, Varon, Yoshelin, 2023. Deforestación En Bolivia. Cambios En La Cobertura forestal 1956-2022. In: Santa Cruz de la Sierra: Fundación Amigos de la Naturaleza, first ed.
Radding, Cynthia, 2001. From the counting house to the field and Loom: Ecologies, Cultures, and economies in the missions of Sonora (Mexico) and Chiquitanía (Bolivia). Hisp. Am. Hist. Rev. 81 (1).
Reis, Tiago, Croft, Simon, Titley, Mark, Tyldesley, Maria, 2023. Soy expansion Drives deforestation in Bolivia. Trase Insights. (Accessed 23 August 2023).
Rivera Cusicanqui, Silvia, 2018. Un Mundo Ch'ixi Es Posible. Un Mundo Ch'ixi Es Posible. Ensayos Desde Un Presente En Crisis. Tinta, limón ediciones, Buenos Aires.
Robbins, Paul, 2001. Fixed Categories in a Portable landscape: the Causes and consequences of land-cover Categorization. Environ. Plan. A Econ. Space 33 (1), 161–179. https://doi.org/10.1068/a3379.
Rodríguez, Iokiñe, Inturias, Mirna, Masay, Elmar, Peña, Anacleto, 2023. Decolonizing wildfire risk management: indigenous responses to fire Criminalization policies and increasingly Flammable forest landscapes in Lomerío, Bolivia. Environ. Sci. Pol. 147 (May), 103–115. https://doi.org/10.1016/j.envsci.2023.06.005.
Rolando, Giancarlo, Sarmiento Barletti, Juan Pablo, 2024. Indigenous peoples as resources and resource Makers in Peruvian Amazonia. J. Peasant Stud. 1–26. https://doi.org/10.1080/03066150.2024.2374734. August.
Roubik, David W., Sakai, Shoko, Karim, Abang A., 2005. In: Roubik, David W., Sakai, Shoko, Abang, A. Hamid Karim (Eds.), Pollination Ecology and the Rain Forest, Ecological Studies, first ed., vol 174. Springer New York, New York, NY. https://doi.org/10.1007/b138701.
Ruilowa, Eduardo, 2024. Mujeres Indígenas Chiquitanas Marchan En Defensa de La Vida y Los Territorios En El Día de La Mujer Boliviana. El Deber. https://eldeber.com.bo/santa-cruz/mujeres-indigenas-chiquitanas-marchan-en-defensa-de-la-vida-y-los-territorios-en-el-dia-de-la-mujer-_387630. (Accessed 11 October 2024).
Salinas, Juan Carlos, 2024. Gobierno Aprueba El Uso de La Biotecnología Del Evento OGM Soya Intacta. El Deber. https://eldeber.com.bo/economia/gobierno-aprueba-el-uso-de-la-biotecnologia-del-evento-ogm-soya-intacta_388507. (Accessed 19 October 2024).
Segarra, Joel, González-Fernández, Andrea, Osorno-Covarrubias, Javier, Couturier, Stéphane, 2024. The Role of critical remote sensing in environmental justice struggles. Progress in Environmental Geography. https://doi.org/10.1177/27539687241269331. September.
Song, Xiao-Peng, Hansen, Matthew C., Potapov, Peter, Adusei, Bernard, Jeffrey, Pickering, Marcos, Adami, Lima, Andre, et al., 2021. Massive soybean expansion in South America since 2000 and implications for conservation. Nat. Sustain. 4 (9), 784–792. https://doi.org/10.1038/s41893-021-00729-z.
Spiers, Roseanna M., Nick, Lewis, 2016. Enactive encounters with the Langstroth hive. In: Biological Economies. Routledge, London; New York, pp. 109–126. https://doi.org/10.4324/9781315731124-8, 2016. | Series: Routledge studies in food, society and environment: Routledge.
Svampa, Maristella, 2015. Commodities Consensus: Neoextractivism and Enclosure of the commons in Latin America. S. Atl. Q. 114 (1), 65–82. https://doi.org/10.1215/00382876-2831290.
Svampa, Maristella, 2022. Extractivism and Neo-extractivism. In: Pellizzoni, Luigi, Leonardi, Emanuele, Asara, Viviana (Eds.), Handbook of Critical Environmental Politics. Edward Elgar Publishing, pp. 270–281. https://doi.org/10.4337/9781839100673.00027.
Swift, Benjamin, Barriga Dávalos, Laura, 2024. El Trasfondo Racista Del Movimiento Ecologista Boliviano. Nacla. February 2024. https://nacla.org/el-trasfondo-racista-del-movimiento-ecologista-boliviano.
Tacchetti, Maddalena, Toro, Natalia Quiceno, Papadopoulos, Dimitris, María Puig de la Bellacasa, 2022. Crafting Ecologies of existence: more than human community making in Colombian Textile Craftivism. Environ. Plan. E Nat. Space 5 (3), 1383–1404. https://doi.org/10.1177/25148486211030154.
TIDN, 2020. Ecocidio En La Chiquitanía. Audiencias Del Tribunal Internacional de Los Derechos de La Naturaleza. Santa Cruz de la Sierra. https://www.cejis.org/wp-content/uploads/2020/10/compilado_audiencias_TIDN_061020.pdf.
Tilzey, Mark, 2021. Authoritarian populism and Neo-extractivism in Bolivia and Ecuador: the Unresolved agrarian question and the Prospects for food Sovereignty as counter-Hegemony. In: Authoritarian Populism and the Rural World. Routledge, London, pp. 266–292. https://doi.org/10.4324/9781003162353-12.
Townsend, Wendy, Adler, Marcia, Martínez, Maira Tatiana, Cuellar, William, Rodríguez, Fernando, Cuellar, Priscila, Toledo, Marisol, 2021. Explorando La Relación de Las Abejas Sin Aguijón y Plantas En Los TCO Sirionó y Lomerío. Guía Ilustrada. In: Santa Cruz de la Sierra: Museo de Historia Natural Noel Kempff, first ed.
Tsing, Anna, 2005. Friction: an Ethnography of Global Connection. Princeton University Press, Princeton.
Tsing, Anna Lowenhaupt, 2021. The Mushroom at the End of the World: on the Possibility of Life in Capitalist Ruins, first ed. Princeton University Press. https://doi.org/10.2307/j.ctvc77bcc.
Tsing, Anna Lowenhaupt, Deger, Jennifer, Saxena, Alder Keleman, Zhou, Feifei, 2024. Field Guide to the Patchy Anthropocene. The New Nature, first ed. Stanford University Press, Stanford, California.
Turker, Kaner Atakan, Murphy, James T., 2021. Assembling community economies. Prog. Hum. Geogr. 45 (1), 49–69. https://doi.org/10.1177/0309132519884630.
Ulloa, Astrid, 2017. Perspectives of environmental justice from indigenous peoples of Latin America: a relational indigenous environmental justice. Environ. Justice 10 (6), 175–180. https://doi.org/10.1089/env.2017.0017.
Ulloa, Astrid, 2021. Repolitizar La Vida, defender Los Cuerpos-Territorios y Colectivizar las Acciones Desde Los Feminismos indígenas. Ecología Política. Cuadernos de Debate Internacional (61), 38–48. https://doi.org/10.53368/ep61fcep03.
Ulloa, Astrid, 2023. Cuerpos-territorios En Movimiento: Mujeres indígenas y Espacialidades Relacionales. In: Maria Silva, Joseli, Ornat, Marcio Jose, Chimin Junior, Alides Baptista (Eds.), Corpos & Geografia. Expressões de Espaços Encarnados. Ponta Grossa, Paraná, pp. 327–344. Toda Palavra.
Ulloa, Astrid, 2025. Relational indigenous Spatialities. In: Latin American Geographies. Routledge, London, pp. 169–180. https://doi.org/10.4324/9781003430926-19.
USAID, 1979. Engineering analysis of the Rio Grande Bridge. San Julian, Colonization and Consolidation. Annexes, La Paz.
Veltmeyer, Henry, Ezquerro-Cañete, Arturo, 2023. Agro-extractivism. J. Peasant Stud. 50 (5), 1673–1686. https://doi.org/10.1080/03066150.2023.2218802.
Vides-Almonacid, Roberto, Reichle, Steffen, Padilla, Fabiola, 2007. Planificación Ecorregional Del Bosque Seco Chiquitano. Santa Cruz de la Sierra: FCBC; The Nature Conservancy, first ed.
Volpato, Gabriele, Benegiamo, Maura, Ellena, Rachele, 2022. The long Reach of commodity frontiers: social reproduction and food Procurement strategies among migrant workers in Kenya's flower farms. J. Peasant Stud. 1–23. https://doi.org/10.1080/03066150.2022.2051492. April.
Vos, Vicent Antonie, Rivero, Carmelo Peralta, Gallegos, Silvia, Cabezas, Stanislaw Czaplicki, 2020. Biodiversidad En Bolivia Impactos e Implicaciones de La Apuesta Por El Agronegocio. Mundos Rurales 15 (1), 25–48.
de Waroux, Polain, le, Yann, 2019. Capital has No Homeland: the Formation of Transnational producer Cohorts in South America's commodity frontiers. Geoforum 105, 131–144. https://doi.org/10.1016/j.geoforum.2019.05.016. September 2018.
Woods, Michael, Fois, Francesca, Heley, Jesse, Jones, Laura, Onyeahialam, Anthonia, Saville, Samantha, Welsh, Marc, 2021. Assemblage, place and Globalisation. Trans. Inst. Br. Geogr. 46 (2), 284–298. https://doi.org/10.1111/tran.12430.
Zambrana Lineo, Alan, 2020. Ecocide in the Bolivian Chiquitanía. Rights of Nature Tribunal: Government, Agribusiness Guilty in the Burning of 5 Million Hectares. The Esperanza Project. https://esperanzaproject.com/2020/latin-america/ecocide-in-the-bolivian-chiquitania/. (Accessed 23 September 2020).
Zuna, Gabriel, Stange, Sophie, Benavides-Frías, Camila, Ortiz-Przychodzka, Stefan, Hanspach, Jan, 2023. Historias de Nuestra Vida Con Las Abejas y Sus Mieles, first ed. Leuphana University, Lüneburg.