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## Maternal substance use disorder predicting children's emotion regulation in middle childhood : the role of early mother-infant interaction

Punamaki, R-L

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# The intersections of mining and neoliberal conservation

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## ABSTRACT

Biodiversity conservation and mining activities are increasingly overlapping throughout the world. While conservation has conventionally been seen as a strategy to oppose the negative environmental impacts of extractivism, the experiences of local communities especially in the Global South reveal similar dynamics in the ways in which mining and conservation actors seek to gain control over land and resources, often resulting in land grabbing. Furthermore, literature on neoliberal conservation has portrayed conservation as an increasingly prevalent strategy of capital accumulation. This study looks at the commodity frontiers of neoliberal conservation and mining – at the spectrum ranging from artisanal and small-scale mining to large-scale corporate mining – and focuses on the competing territorialisations at these heterogeneous ‘double’ frontiers. Analysed by means of an integrative literature review and illustrated with cases from across the Global South, this study asks just what institutional settings enable the mining and conservation frontiers to co-exist and what kinds of interactions can be expected at their intersections. The study finds three different types of double frontier interactions, competing, synergistic and co-ignorant, resulting alternatively from deepened cooperation between international mining and conservation actors, a fragmented state structure or legal pluralism at the local level. These findings provide a first attempt to create a theoretical framework for analysing the intersections of the expanding mining and conservation frontiers. They highlight the need for further empirical research to focus on double frontier contexts and particularly on the roles played by local actors between the frontiers in order to address, understand and manage the increasing competition between mining and conservation across the rural landscapes of the Global South.

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## 1. Introduction

Mineral extraction and biodiversity conservation activities are increasingly overlapping across the globe. Growing material consumption and renewable energy transition are increasing demands for minerals simultaneously as ambitious targets are being set under the United Nations Convention on Biological Diversity to expand protected areas (Jowitt et al., 2020; Paulick & Machacek, 2017; Tabejin et al., 2021; Waldron et al., 2020). It is estimated that the globe’s high biodiversity areas coincide with 23% of mines and 20% of ore deposits of bauxite, silver, iron, gold and copper (Murguía et al., 2016). Areas of intermediate biodiversity overlap with 63% of mines and 61% of deposits of the same metals (Murguía et al., 2016). Recent studies have recognised this growing overlap and the need to address the intensifying competition of land areas between mining and conservation activities (Sonter et al., 2018). Particularly in the Global South, the trend is likely

to lead to increasing situations where local communities face attempts by conservation and mining agents to gain access to and control over their lands to commodify and profit from the local nature (Conde et al., 2017; Igoe & Brockington, 2007).

This article fills this gap through a theoretical analysis of the overlapping commodity frontiers of mining and conservation. Both frontiers have received much attention separately, and mining and conservation activities have been treated in parallel in the frontier literature (Rasmussen & Lund, 2018) as well as in studies focusing on the ecotourism-extraction nexus (Büsher & Davidov, 2013). The purpose of this article is to examine the institutional arrangements that allow the seemingly unfitting mining and conservation frontiers to expand and co-exist in the same spaces and to conceptualise the interactions characterising these ‘double’ frontiers.

The review is motivated by my fieldwork in several locations in Madagascar, where artisanal and small-scale mining (ASM) and large-scale corporate mining (LSM) co-exist with conservation activities. In those localities, it is challenging to understand the relationships between the local communities and mining and conservation actors as well as the interplay with other stakeholders because such relationships do not seemingly follow any clear-cut

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pattern: sometimes cooperation is evident between local communities and artisanal miners, miners and conservation NGOs, or conservation NGOs and mining corporations. At other times, several of the actors are in conflict with one another, while making deals with others; there are no clear boundaries between the different 'camps' (see also Golub, 2014). Conceptually, the situation is difficult to grasp. The land appropriation carried out by foreigners and their Malagasy partners, be it in the name of conservation or corporate mining, could easily be categorised as one phenomenon from the point of view of the Malagasy peasants. However, when ASM enters the picture, it seems to represent a form of extractivism that those same land-appropriating foreigners and Malagasy elites fight against and try to repress.

To build an analytical framework for analysing such complexities of natural resources management in the post-colonial, rural margins, the concept of commodity frontier is brought to the centre. Commodity frontier refers to a dynamic initiated by the invention of a novel way of extracting value out of nature that requires a restructuring of local nature-society relations (Barney, 2009; Kelly & Peluso, 2015; Moore, 2000; Rasmussen & Lund, 2018). Attempts to produce new commodities from a previously uncommodified nature stem from the need of capital accumulation to continuously find new sources of cheap raw material, labour, food and energy to be exploited (Harvey, 2003; Moore, 2015). The frontiers of mining and conservation examined here are defined as commodity frontiers (as opposed to, e.g., resource frontiers) since they are based on the continuous effort to expand and increase profit by producing commodities for external markets (Kröger & Nygren, 2020). To achieve such an end, new systems of resource access are put into place that exclude previous land and resource uses and often lead to the displacement of local communities (Rasmussen & Lund, 2018). Frontier refers to a moment in space and time when the new relations of authority, ownership and production are contested, often in violent struggles (Rasmussen & Lund, 2018).

A myriad of interactions take place in frontier spaces as frontier actors, including states, corporations, local communities and elites, all seek to find the best possible deal for themselves (Côte & Korf, 2018). Frontier is thus a flexible geographical unit of study that can be used to examine the interactions between the global and local (Barbier, 2012; Barney, 2009; Moore, 2000). It can be used as a sensitive tool to accommodate the diversity of interactions and outcomes of processes by which global capitalism becomes entangled with local socio-ecological and socio-political realities (Tsing, 2011).

The focus here is on the capital-accumulating, land-appropriating, violent commodity frontiers that are usually instituted and dominated by external actors. The 'mining frontier' discussed in this paper refers to a wide range of activities. The forms that it takes depend on the mineral extracted as well as on the technologies employed and can also be differentiated by scale: from artisanal, non-mechanised and perhaps seasonal extraction, to semi-industrial, small and medium-sized operations, and ultimately, to massive open-pit mines operated by transnational mining corporations (Arboleda, 2020). In the existing literature on ASM operations, the types of mining are further divided into terms of labour relations, legality or illegality, and actors directly involved (e.g., local or migrant) (Gudynas & Rojas, 2020; Verbrugge & Geenen, 2020). The focus here is on the frontier expansion taking place through this range of mining activities.

In terms of conservation, this paper focuses on the practices of enclosing land and sea areas as protected areas through actions of dispossession and dissolution of the commons that have characterised colonial, exclusionary conservation approaches for over a century, displacing millions of people around the Global South (Dowie, 2009). In rupturing the local socio-natural relationships of indigenous and local populations, this wave of displacements

has serious counter-productive consequences for the conservation of biological diversity (Dowie, 2009). Meanwhile, conservation practices focusing on the establishing of protected areas can create the very conditions that facilitate the expansion of capitalist means of production and accumulation (Kelly, 2011). The literature on neoliberal conservation has shown that since the late twentieth century, the conservation sector across the globe has been strongly influenced by economic liberalisation policies, thereby implicating the sector in the accumulation of capital on a massive scale (Igoe & Brockington, 2007). This can be seen in, for instance, a proliferation in the corporate sponsorship of conservation organisations, privatisation of protected area management and increasing popularity of ecotourism as a mechanism of deriving profit from conservation. As a result, control of conservation operations is increasingly in the hands of powerful global market-based (or tightly connected with market-based) actors, and the mechanisms of conservation are increasingly based on global markets (Büscher & Fletcher, 2014; Igoe et al., 2010). The resulting privatisation of land in the name of conservation has been further described in studies on what has been termed green grabbing (Fairhead et al., 2012).

This contribution conceptualises 'double frontiers' of mining and conservation. In doing so, it aims to increase theoretical understandings of situations where two or more commodity frontiers overlap in the same physical environment. Recent literature has shed light on the many different combinations in which two or more commodity or resource frontiers can overlap. Bainton et al. (2020) and Kemp & Owen (2019) analyse the many 'interfaces' between small-scale and large-scale mining in specific 'resource conjunctures'. Meanwhile, Käkönen & Thuon (2019) look into the overlapping 'zones of exclusion' constituted by hydropower, forestry and conservation initiatives. The objective of this paper is to conceptualise the interactions between two very specific kinds of commodity frontiers, those of mining and neoliberal conservation with specific focus on territorialisation. The aim is to provide theoretical insights that can be used also in the analysis of empirical, more complex, multiple frontier case studies.

The arguments put forward in this article are based on a review of academic literature and an examination of four case studies, explained in Section 2. Section 3 analyses the frontier dynamics at a range of different mining and conservation operations. The fourth section introduces four double frontier cases from the Global South, while the fifth analyses the institutional settings of territorialisation in each of these cases, which explain what enables the double frontiers to exist and what type of interaction dominates the relationships between frontier actors. Finally, the article concludes by examining what theoretical and empirical gaps still need to be filled by research on double frontiers.

## 2. Materials and methods

This study is the result of participant observation in Madagascar at locations where mining and conservation activities overlap. I have done fieldwork in and around the protected areas of Ranomafana National Park, Loky Manambato New Protected Area and Andasibe-Mantadia National Park for a total of seven months during the years 2014–2019. During this time, I have spoken with members of local and mining communities, protected area agents, local and state authorities, and civil society actors and stayed in villages affected by both conservation and (possibly multiple forms of) mining activities. I have also witnessed an increase in insecurity and violence during those six years in Ranomafana as a result of the competition between the two frontiers: increasingly frequent and increasingly violent clashes between military forces enforcing conservation rules and artisanal miners hiding and working in the conserved forest. This competition was entangled with and most

likely increasing in turn existing tensions with respect to park-people relations, ethnic relations and overall poverty in the area. While some of the dynamics were repeated at Loky Manambato and Andasibe-Mantadia, different conservation models or the presence of LSM in those areas produced interactions of different kinds.

During my fieldwork, it became clear that no previous theoretical framework could fully account for such conflicts and interactions. Therefore, the purpose of this study is to create, through induction, a broader theoretical framework that will help explain the dynamic intersections of mining and conservation beyond just my case study sites in Madagascar. To that end, this article combines two strands of literature that have previously existed mostly separately – those dealing with mining frontiers and those dealing with neoliberal conservation – focusing in particular on their territory-making logics and frontier nature. I use an integrative literature review methodology for combining, synthesising and criticising the two strands of literature in order to enable new theoretical frameworks and perspectives to emerge (Snyder, 2019; Torracco, 2005). The studies included in the literature review were identified through searches of various social science databases and by 'snowballing' from existing sources.

Furthermore, I carried out extensive searches of academic case studies, news articles, reports and other types of literature to locate cases that exemplify the range of different mining-conservation double frontier situations from across the Global South. The case selection was based on diversity, which was sought in terms of two factors: first, the scale of mining and, second, the flexibility of conservation rules (defined in the International Union for Conservation of Nature (IUCN) protected area categorisation list). Cases were sought where the two factors appeared in different combinations, leading to the selection of four cases that represent the overlaps of 1) LSM and a flexible protected area, 2) LSM and a strict protected area, 3) ASM and a strict protected area, and 4) ASM and a flexible protected area. Based on the secondary literature, the territorialisation approaches in each of these cases were compared, with special attention paid to the various contextual details, to create more generalisable understandings of how double frontiers emerge and the kinds of interactions that predominate in such frontier spaces. The study identifies systematic differences among the cases and establishes a principle of variation (Azarian, 2011): a set of factors proposed to explain the various double frontier interactions. As each different mining/conservation combination is represented by only one case, it is clear that the sample does not capture the full diversity of possible mining and conservation interactions. It does, however, illustrate a variety of institutional arrangements in cases similar enough in terms of the process investigated (i.e., the overlap of mining and conservation activities) to describe, with nuance, the phenomenon of double frontier and draw a preliminary hypothesis to be tested in further research.

### 3. Conceptualising the frontiers of mining and conservation

When looking at an eco-tourism landscape, a large-scale coal mine or an alluvial gold extraction area, it is obvious that the institutional arrangements and actors involved in their creation are quite different. Nonetheless, many elements are still common to all these frontiers (Rasmussen & Lund, 2018). The diverse types of mining and conservation frontiers can all be viewed as spaces where global market interests penetrate local structures (Rasmussen & Lund, 2018). But while the aim is to commodify nature and produce value from it by selling to external markets, in practice this can be done in a myriad of ways. Therefore, this section draws attention to the diverse mining and conservation frontiers operating in parallel from three different theoretical

perspectives. First, the analysis focuses on the processes of organising what Moore (2015) calls cheap labour and cheap nature for profit making. Secondly, territorialisations at different mining and conservation frontiers are examined. Such processes are essential at commodity frontiers because commodity-making often requires redefining, reregulating and enclosing the pre-existing socio-nature system and suppressing possible local resistance (Dunlap & Jakobsen, 2020). Third, territorialisation seeks to create a territory. The type of territory created, particularly in terms of how open it is for other land-uses and how strictly limited its borders are, influences the ways in which the two frontiers may interact: whether they seek to erase each other or whether they may co-exist. Therefore, the third perspective of analysis is that of the intended type of territory.

#### 3.1. Organising cheap nature and cheap labour to commodity production

First, the activities taking place at commodity frontiers represent an attempt to transform the previously uncounted and untradable nature into commodities that can be sold on external markets. Conservation efforts seek to turn native homelands into attractions, conservation 'success stories', carbon sinks and biodiversity offsets that can be sold to a donor community, ecotourists and governments (Igoe & Brockington, 2007; Castree, 2008). When such an overarching global conservation agenda touches ground, it 'intervenes in diverse biocultural systems around the world, displacing, enclosing, commodifying, and spectacularising them into the idealised natures that are to be saved' (Büscher et al., 2012, p. 23). At the same time, the commodities produced (i.e., raw minerals) at mining frontiers are more tangible and the reorganisation and destruction of biocultural systems more dramatic and disastrous; the processes of land dispossession and export orientation (with raw materials typically processed elsewhere and sold on global markets) still, however, carry a similar, extractivist logic (Arboleda, 2020).

Second, frontier expansion serves the purpose of capital accumulation by unlocking new reserves of cheap nature and cheap labour (Moore, 2015). Moore highlights how capitalist production systems over the past five centuries, backed by imperial power and a nature/society dualism, have mobilised the work of nature, including low-paid or unpaid racialised and gendered human labour, in the service of the endless accumulation of capital. By expanding to countries of the Global South, new reserves of cheap labour are made available for mining and conservation operations. Even if conservation may not constitute the most labour-intensive sector, protected areas also depend on local low-wage labour (Sodikoff, 2009). Such manual, unskilled work is usually done by those local community members who have a relatively stronger societal standing (Sodikoff, 2009), and the labour relations take different forms including non-contracted wage labour (e.g., forest patrolling paid on an hourly basis) and independent, non-wage labour (e.g., local freelance guides directly offering services to eco-tourists). A wide range of labour relations exists at mining frontiers, from predominantly wage-based work in the LSM sector to multiple forms of labour and informal work agreements, labour processes, job requirements and relations among workers and between workers and capital owners characteristic of ASM operations (Samaddar, 2018). Gudynas and Rojas (2020) argue that understanding the extractivist frontier nature of ASM work requires zooming out from an individual miner and considering *all miners* collectively with different levels of mechanisation and volumes of extraction (not only the kilograms of the mineral produced but also the matter removed to access the mineral). The export orientation of raw minerals, the removal of high volumes of matter and the high intensity of environmental impacts all high-



light the extractivist nature of ASM (Gudynas & Rojas, 2020). In the larger picture, the 'extractive peasants' involved in ASM work are integrated into the neoliberal regime of accumulation by mineral extraction through supply chains and networks (Dunlap & Jakobsen, 2020; Lahiri-Dutt, 2018a). Similarly, some peasants living within multiple-use conservation areas have participated in the expansion of extractivist activities within these conservation units (Kröger, 2020b).

Verbrugge and Geenen (2019) conceptualise ASM work to access gold deposits as part of the global production system for gold. According to this view, ASM can be seen as a socio-technical innovation, a solution to expand the frontier in areas in which LSM cannot operate. Some deposits are too small, shallow, scattered or remote for economically viable large-scale operations but relatively easy to reach with various smaller-scale techniques (Lahiri-Dutt, 2018a). Fiscal and environmental regulations (such as for protected areas) add costs and pose obstacles for industrial mining; in such instances, ASM offers a solution simply by being so much less formal (Verbrugge & Geenen 2019, 2020). Artisanal miners are a prime example of cheap labour: a poverty-driven, flexible workforce ready to migrate and take risks to make a living, thereby offering a link between once remote locations and global commodity networks (Lahiri-Dutt, 2018b). Meanwhile the lack of formality and employment contracts ensure that possible injuries caused by the risky work as well as arrests and fines by law enforcement never appear as costs of production higher up on the value chain (Verbrugge & Geenen, 2019). In fact, the enormous diversity of ASM activities and connections with industrial mining suggests that the dualist division between LSM and ASM does not actually reflect reality (Verbrugge & Geenen, 2020). Rather, all mining activities should be understood as various aspects of the global production system for the mineral in question (Verbrugge & Geenen, 2020).<sup>1</sup>

### 3.2. Territorialisation at mining and conservation frontiers

The extraction of value from nature necessitates establishing control over land and resources, that is to say, territorialisation. Territorialisation is thus one of the key processes taking place at frontiers, and it is defined as actions aimed at consolidating control over space, including its resources and people (Rasmussen & Lund, 2018).

The state is often seen as the main actor in territorialisation, acting to enhance its sovereignty, but it is also the agent allowing and facilitating territorialisation by non-state actors, such as corporations (Ne vins et al., 2008; Vandergeest & Peluso, 1995). Vandergeest and Peluso (1995) have identified three main components of state-led territorialisation: mapping of boundaries, establishing and enforcing new rights, and determining acceptable resource uses. With state-led territorialisation, local opposition is often repressed by state institutions by means of outright violence or political exclusion (Dunlap & Jakobsen, 2020; Ehrnström-Fuentes & Kröger, 2018). The exclusion of local communities is further justified by othering and framing local land use practices as backwards and destructive (Fairhead et al., 2012; Seagle, 2012; Toivanen & Kröger, 2018). Such rhetoric obscures the existence of social or ontological conflicts over 'the ideas of what constitutes the nature of resources, as well as the rules that govern their use and control' (Rasmussen & Lund, 2018, p. 389).

Territorialisation for conservation purposes is typically directed by the state, but the rise of more neoliberal modes of conservation has opened control over protected areas to international networks

of corporations, multi-lateral financial institutions and large international conservation NGOs and states (Igoe & Brockington, 2007). Similarly, the entry of mining companies into new countries and areas has been facilitated by the liberalisation of mining sector regulations as a part of structural adjustment policies (SAP) since the 1980s (Bebbington et al., 2008). These reforms have limited the capacity for state intervention and fragmented regulations on the environmental and the social impacts of investment projects aiming to attract foreign investment in the LSM sector – leading to the establishment of resource enclaves across the Global South and triggering hundreds of conflicts between mining projects and local communities worldwide (Conde et al., 2017; Özkaynak et al., 2012).

The interactions between mining operations at different scales provide interesting viewpoints on state governance. The relations between (formal and often state-supported) LSM and (often informal) ASM are often uncomfortable, and the 'mining constellations' they produce in Africa and elsewhere have been seen as battlegrounds for small and large-scale actors attempting to claim the land or find a way to coexist (Aubynn, 2009; Hilson, 2002). Such situations are always mediated by states able to distribute unequal political rights among the various players (Côte & Korf, 2018), and indeed, most mineral-rich countries in the Global South are regarded as biased in favour of LSM operations (Hilson, Sauerwein, and Owen, 2020). Structural reforms have positioned host governments to secure continuous revenue from LSM and mineral exploration companies in the form of taxes, rents and permit fees. The need to support the growth of the LSM industry often allows for the rapid entry of companies into the country and a disregard for or (more often) active expulsion of ASM operations from the sites (Hilson, Sauerwein, and Owen, 2020). Due to the informality of the ASM sector, its presence has been viewed as a challenge to corporate and government control of resources (Dunlap & Jakobsen, 2020; Lahiri-Dutt, 2018a).

Indeed, the state is not the only source of legitimacy for territorialisation. ASM, even if existing outside the impositions of formal state institutions, policies and laws, does in practice claim land and resources and constitutes certain types of 'resource governmentalities' (Foucault (1978), as cited in Peluso, 2018). In such frontiers, access to minerals and control over the land are established through many structures. The organisation of artisanal production, and the definition of who is allowed to enter the mining site may be based on legal means, corruption or violence, or a mixture of those (Gudynas & Rojas, 2020). Local socio-political structures and land tenure systems play important roles in regulating access as well (Verbrugge & Geenen, 2019). Peluso (2018) has examined the territoriality of ASM gold mining operations in West Kalimantan 'not as an imposition of control but rather as a spatialised and contingent expression of control' (p. 405). Miners and other related workers are not necessarily interested in establishing long-term land control. Instead, the ASM territories emerge through production and organisation processes and are inherently mobile, like the miners themselves (Peluso, 2018). Collectively, miners reorganise rural landscapes and economies to produce extractive territories out of previously agrarian landscapes (Lahiri-Dutt, 2018b).

Emergent ASM territorial systems are deeply entangled with other actors in possession of some sort of territorial power (Peluso, 2018), including 'shadow state' actors, that is, state agents engaging in and benefiting clandestinely from the illegal production trade (Duffy, 2005; Reno, 1995). In extraction areas, different groups compete for access to minerals, and the actors who control capital and are able to exercise violence (state and non-state actors) mediate the competition by accepting some and expelling others (Gudynas & Rojas, 2020). The role of government agents operating at the edge of official and unofficial regulation is often essential in allowing for illegal ASM operations and the associated

<sup>1</sup> This is even more evident when artisanal miners operate at functioning or abandoned industrial mining sites forming specific, although sometimes conflicting, mineral production systems.

'land grabbing from below' (Hausermann & Ferring, 2018; Van Bockstael, 2019). Importantly, however, the underground operation and top-down power exercised by shadow state agents does not alone explain the nature of ASM territorialisation efforts (Peluso, 2018). Local communities holding customary land rights can likewise play an important role in interactions and negotiations with ASM actors (Van Bockstael, 2019). In sum, frontier dynamics of artisanal to semi-industrial mining are marked by legal pluralism, while ASM territories – their rules, stability and relations with commercial chains – are regulated by a mixture of local customary structures, formal state structures, shadow state actors and non-state armed groups.

### 3.3. Intended outcomes of territorialisation: Types of territory

Frontiers are, by definition, spaces where territorial control is contested, territorialisation is not complete and it is too early to talk about territory (Rasmussen & Lund, 2018). However, to understand the ways in which two overlapping frontiers interact, it is useful to consider their goals – even if not yet achieved. The territorial goal, or the type of territory intended, influence the extent to which the frontier actors aim to co-exist with other types of land use or erase them. Therefore, before examining double frontier interactions, it is pertinent to briefly consider the different types of intended territories via the diverse interests involved in establishing LSM, ASM and conservation frontiers separately.

LSM concessions have sharp, mapped boundaries registered at the state mining bureaus, which establish and enforce the rights of land control and access granted to the mining company and determine acceptable resource uses for the concession site. Even though in practice the boundaries of LSM sites are crossed by, for example, the informal presence of small-scale miners and environmental impacts and infrastructures spread much wider than the mining site itself, the intended territory can be described as *limited* and *closed*. Second, there are 'emergent' small- to medium-scale mining territories, which have no boundaries drawn on maps and no internal singular control (Peluso, 2018). These territories can be described as *open* and *mobile* by nature.

Conservation territories have similar characteristics to LSM territories, as they involve distinct, mapped boundaries and the state establishes and enforces management rights for the conservation agent and determines acceptable resource uses (Corson, 2011). Even though this generally applies to the neoliberal conservation areas examined in this article, two types of conservation territories can be distinguished here. First, strict forms of conservation territory that exclude most other land uses, in particular local subsistence activities, correspond generally to the IUCN protected area categories I–IV (IUCN). These territories should be *limited* and *closed*. Second, flexible forms of conservation territory can be found in the IUCN categories V–VI and they generally tolerate some defined subsistence activities by local populations, typically in specific zones within the territory. The territory is thus *limited* but remains *partially open* to other land uses as well as to overlapping structures of land access and ownership (e.g., prevalent among local communities as customary structures or land-use legislation regulated by state administrative sub-areas).

To best understand the nature of the types of territories outlined here, the description provided by Painter (2010) is illustrative and relevant, even though his analysis focuses on state territories – the types of territories often imagined as most strictly limited, closed and stagnant. Painter argues: 'territory is necessarily porous, historical, mutable, uneven and perishable. It is a laborious work in progress, prone to failure and permeated by tension and contradiction. Territory is never complete, but always becoming' (p. 1094).

### 3.4. Summary of the key elements of conservation and mining frontiers

This section has analysed the ways in which certain key elements of commodity frontiers are manifested in different conservation and mining frontiers. Table 1 summarises the discussion. In this examination, conservation frontiers are further divided by stricter and more flexible forms of territorialisations based on the IUCN categories. Mining frontiers in turn are divided into large-scale, semi-industrial and artisanal mining frontiers. Commodities, markets and labour relations relevant to each type of frontier are summarised in the three first rows and discussed in subsection 3.1. Subsection 3.2 has focused on territorialisation and, based on the discussion, Table 1 shows the source of legitimacy for territorialisation pertinent to each frontier type. Finally, the types of territory intended by territorialisation, presented in subsection 3.3., are summarised in the last row. These clarifications are used in the following sections, which analyse the interactions at mining and conservation double frontiers.

## 4. Cases of intersection between mining and conservation commodity frontiers

This section presents case examples from Zimbabwe, Madagascar, Peru and Gabon, from areas where mining and conservation overlap. The selected cases illustrate the range of dynamics that can be expected in instances where the territorialising forces of two capital-accumulating frontiers intersect. The key elements of the frontiers in each case study are outlined in Tables 2 and 3.

### 4.1. Fort Dauphin, Madagascar

Different types of cooperation between mining and conservation interests has been increasing during the past few decades (Brock, 2020; Enns et al., 2019). With the growing sustainability discourse that emerged in the 1990 s, mining companies have found it necessary to showcase their sustainability considerations through media and public discussions to maintain the legitimacy of their operations and a continued access to land and flow of profits (Seagle, 2012). Coinciding with the emerging neoliberal conservation efforts, mining companies have entered into negotiations and deals with conservation actors, producing win-win-win spectacles and ostensibly solving ecological, social and economic issues simultaneously through CSR, while supporting market-based environmental initiatives and biodiversity offsetting (Cavanagh & Benjaminsen, 2014; Dunlap & Jakobsen, 2020).

The QIT Madagascar Minerals (QMM) ilmenite mine in south-eastern Madagascar is an illustrative example of such synergy. The mining project began in 2005 and is led by Rio Tinto, one of the world's leading mining companies, with the Malagasy state as a smaller shareholder (Seagle, 2012). Though destroying a unique coastal forest ecosystem, the QMM project has strived for a 'net positive impact' on biodiversity by offsetting. Conservation already began in the region in 1999 but the offsetting project expanded the conservation frontier in 2008 with three conservation sites (Seagle, 2012). The Mahabo and Sain Luce offset sites are both officially community-based conservation projects, with their technical management supported by, for example, the Missouri Botanical Garden (MBG, 1995–2020). The Bemangidy-Ivohive offset site helps preserve a 60,000 ha flexible protected area, the Tsitongambarika Forest (Huff & Orengo, 2020; WRM and Re:Common, 2016). It is managed by Birdlife International and its Malagasy affiliate, Asity Madagascar, and supported by Rio Tinto and a number of international environmental NGOs (Seagle, 2012). Nonetheless, the QMM project has faced widespread criticism for both its environmental and social impacts. It

**Table 1**  
Key elements of the conservation and mining commodity frontiers.

	Conservation		Mining		
	Strict	Flexible	Large-scale	Semi-industrial	Artisanal
Commodity	Nature attractions, spectacles, conservation 'success stories', ecosystem services, etc.		Raw minerals, metals, precious stones		
Markets	Philanthropic organisations, tourists, governments		Industries and consumers using minerals; Markets are local, national or global depending on the mineral, but export orientation is dominant		
Labour relations	Wage and non-wage labour; unskilled, manual workers, typically local		Mainly wage labour; unskilled, manual workers, may be local or migrant		Wage and non-wage labour; unskilled, manual workers, may be local or migrant
Source of legitimacy for territorialisation	State, international conservation networks		State, influenced by international financial institutions	State, shadow state, non-state armed groups	Local customary structures, 'emergent' structures, state, shadow state, non-state armed groups
Type of territory	Limited, closed	Limited, partially open	Limited, closed	Both limited/closed and mobile/open	Mobile, open

**Table 2**  
Key characteristics of the mining commodity frontiers.

Case	Fort Dauphin, Madagascar	Hwange, Zimbabwe	Madre de Dios, Peru	Ndangui, Gabon
Scale of mining	Large-scale	Large-scale	Small- and medium-scale	Small-scale
Mineral	Ilmenite	Coal	Gold	Gold
Actor	Mining company QMM owned by Rio Tinto and the state of Madagascar	Several Chinese and partly state-owned mining companies	Semi-industrial mining companies, individual artisanal miners; from the Andes, abroad and local	~600 local artisanal miners
'Age' of the frontier	Greenfield, the first large-scale mine in the region, project started in 2005	Brownfield project; coal mining in Hwange since 1902	Mining at least since the early 1900 s, gold rush accelerated in early 2000 s	Since 1960 s
Method of extraction	Dredging from artificial freshwater lakes	Open pit and underground mining	Alluvial gold mining via dredges and other heavy machinery, also artisanal panning, mercury amalgamation	Alluvial gold panning, very low level of mechanisation
Examples of environmental impacts	Biodiversity loss, soil contamination, loss of vegetation cover, surface water pollution	Air pollution, surface and underground water pollution, deforestation, subsidence of surface, noise disturbance and habitat fragmentation driving animals into human settlements	Mercury contamination, deforestation, sedimentation, removal of whole riverbeds	Sedimentation, deforestation
References	(Huff & Orengo, 2020; Seagle, 2012; Temper et al., 2015)	(CNRG, 2020)	(Damonte, 2016; Palmer, 2019; Salo et al., 2016)	(Hollestelle, 2012)

**Table 3**  
Key characteristics of the conservation commodity frontiers.

Case	Fort Dauphin, Madagascar	Hwange, Zimbabwe	Madre de Dios, Peru	Ndangui, Gabon
Type of conservation	IUCN category V Protected Area (some subsistence activities allowed) and community-based conservation projects	National park and safaris	national parks and reserves; ecotourism and conservation concessions; territorial and communal reserves	Forest concessions under sustainable management (part of a network of forest concessions and national parks)
Main commodity	Biodiversity offset	Wildlife tourism: safaris, trophy hunting	Eco-tourism, conservation management	Timber by selective logging, private management
Manager of protected area	Private Malagasy NGO Asity and Birdlife International	State; private safari companies	State; private organisations, companies, individuals; state and indigenous groups co-management	Private company Cora Wood Gabon S.A.
Examples of other conservation actors involved	World Conservation Society, Conservation International, Missouri Botanical Garden, USAID, IUCN	World Bank, GEF, WWF	GEF, UNDP	International Tropical Timber Organisation, WWF
Age of the frontier	Community-conservation efforts began in the area in 1999; biodiversity offset established in 2008	Protected area establishment by colonial power since the 1920 s	Manú National Park established in 1973; Conservation concession established in 2001	Forestry concessions integrated in conservation efforts through forest management plans since the 1990 s
References	(Huff & Orengo, 2020; Seagle, 2012; WRM and Re:Common, 2016)	(Chigonda, 2018; CNRG, 2020; GEF, 2021; The World Bank, 2021)	(Álvarez et al., 2008; Amazon Conservation Association, 2021; Kirkby et al., 2011; Shepard et al., 2010; Vuohelainen et al., 2012)	(Ahimin et al., 2019; Hollestelle, 2012; Karsenty, 2018; Karsenty & Ferron, 2017)

has been accused of a 'double land grab', failing to provide adequate consultation with and compensation to displaced populations from both mining and offset sites and causing severe insecurity for the impacted communities (Ballet & Randrianalijaona, 2014; Huff & Orengo, 2020; Seagle, 2012; WRM and Re:Common, 2016). Both QMM and BirdLife International have justified the confiscation of land from local communities by means of othering and presenting local subsistence livelihoods as a threat to biodiversity conservation (Ballet & Randrianalijaona, 2014; Seagle, 2012).

The deepened relations between conservation and mining interests stem from two primary motivations, according to Enns, Bersaglio and Sneyd (2019). First, such cooperation gives mining companies the possibility for spatial and socio-ecological fixes to the crises caused by depletion and destruction (Harvey, 2001). It allows them to spatially expand into new areas, even those otherwise 'closed' by conservation regulations (Enns et al., 2019). Second, through collaboration both sectors find completely new ways to produce value from nature (Enns et al., 2019). The actual 'wins' of such win-win-win spectacles may not have to do so much with the biodiversity being conserved as the increased ability of both industries to influence state politics, consolidate their power over land and accumulate capital (Brock, 2020). Indeed, the case of QMM is best interpreted in a context of fragmented state authority due to a neoliberal project implemented in Madagascar chiefly by the World Bank that allows private corporations and international environmental NGOs greater access and authority over Malagasy land (Huff & Orengo, 2020).

#### 4.2. Hwange, Zimbabwe

When international conservation and mining actors are interested in the same land areas, synergies are not always found. In cases of competition, government intervention is often called upon as the primary means to mediate the conflict of interest between conservation and mining actors (Armendáriz-Villegas et al., 2015; Farrington, 2005; Villén-Pérez et al., 2018). Such events have recently taken place in Zimbabwe, in the Hwange District, where wildlife conservation and coal mining frontiers have expanded onto the same land. Seventy-five per cent of the district's 21,956 km<sup>2</sup> land area is occupied by the Hwange National Park and several privately managed safaris. The remaining 25 per cent of land is shared by human settlements and the mining industry (CNRG, 2020).

Conservation in Zimbabwe has been implemented via command-type legislation since colonisation in the late 19th century, dispossessing indigenous communities of their natural resources in the process (Chigonda, 2018). Hwange National Park was originally established as a game reserve in 1928 and transformed into a national park in 1961. After independence, private wildlife conservancies have proliferated, and rural communities continue to lack land ownership and management rights (Chigonda, 2018). International conservation and development organisations are strongly involved in the conservation scene in Zimbabwe. Recently, for instance, Hwange National Park has been one of the target areas in a US\$29 million conservation project funded by the Global Environment Facility (GEF) and the World Bank and implemented by the WWF (GEF, 2021; The World Bank, 2021). The Hwange-Sanyati Biological Corridor project took place in six districts in the years 2014–2019. Such efforts have been documented due to the fact that certain failed governance structures have contributed to the disempowering of local communities and altering of local economics, including local people's relationship with wildlife (Dube, 2019).

The mining frontier has expanded during the past decade in Hwange, where at least ten coal mining and coking companies

now operate (CNRG, 2020). Coal mining has modified the landscapes on a dramatic scale, in many cases permanently, and it has seriously impacted the health of humans and the ecosystem as a whole. Its recent expansion is the result of a US\$12 billion mining roadmap launched by the Zimbabwean government in 2019 (CNRG, 2020). In early 2020, only some months after the closure of the GEF, the World Bank and WWF Hwange-Sanyati conservation project, a state-owned mining development corporation and its Chinese partner companies started coal mining exploration in Hwange National Park (CNRG, 2020).

The mining activities disturbed wildlife, especially elephants, who as a result fled from the park. This heightened the local human-wildlife conflict, with tens of villagers killed and crops and homes destroyed (CNRG, 2020). The Zimbabwean Environmental Law Association filed an application with the high court, arguing that granting the mining concession is in violation of the country's Environmental Management Act since it was issued before an environmental assessment was made and without consulting with the Ministry of Tourism and Hospitality (OWP, 2020). As a result, in September 2020 the government announced a ban on mining in national parks, thereby cancelling the exploration work being done in Hwange National Park (BBC, 2020). The central element explaining the double frontier in Hwange is the superposition of land rights, which are given by different state agencies and entail different use and ownership rights to the same land area. Prioritised by state politics, both frontiers contribute to the confiscation of land from local communities.

#### 4.3. Madre de Dios, Peru

Madre de Dios in the Peruvian Amazon is one of the most famous examples of a conflict between conservation and ASM actors. Most of the land in Madre de Dios consists of a network of protected areas of various types (Palmer, 2019). Strict, state-managed national parks and reserves, such as Manú National Park established in 1973, have followed an exclusionary conservation model with the intent of displacing native inhabitants (Shepard et al., 2010). Some of the ancestral territories were reclaimed at the turn of the millennium as part of an effort to create territorial reserves and communal reserves, such as the Amarakaeri Communal Reserve, with financial support from the Global Environmental Fund, through the UNDP (Álvarez et al., 2008). These reserves are officially co-managed by the state and native groups, but the native communities continue to present claims for effective self-determination particularly since they fear the state might grant companies petroleum exploration rights in the future<sup>2</sup> (Álvarez et al., 2008). At the same time, the conservation frontier in Madre de Dios has been opened for ecotourism and conservation concessions leased to individuals, organisations, communities or companies under public-private partnerships (Amazon Conservation Association, 2021; Vuohelainen et al., 2012).

Native people and temporary immigrants from the Andes have accessed gold deposits in Madre de Dios with ASM techniques for at least a century, and the Peruvian state even encouraged such activity in the 1970s (Damonte, 2016). Since 2006, however, the construction of the Peru-Brazil Interoceanic Highway has made the forests of Madre de Dios easily accessible to anyone, increasing the number of small- and medium-scale gold miners (Vuohelainen et al., 2012). To date, alluvial gold mining has resulted in the loss of 106,800 ha of primary forest, with the majority of the loss occurring after 2013 (Asner & Tupayachi, 2017; Palmer, 2019). Furthermore, mercury is used widely to separate gold from the dirt

<sup>2</sup> A third overlapping frontier has already existed for a century in Madre de Dios (Álvarez et al., 2008).



surrounding it, exposing the environment, local indigenous groups and miners alike to mercury contamination (Asner & Tupayachi, 2017). Most miners are immigrants from the Andes, but some are Amazon natives and foreign miners from China and Russia (Damonte, 2016). The scale of gold mining operations ranges from artisanal panning to semi-industrial, extensive operations using heavy machinery (Damonte, 2016). Most of the mining is done either individually or by companies using wage labour, and it occurs mainly informally and is controlled by mafias, even though a permit process and legally organised miners' groups also exist (Damonte, 2016). The trade network for gold from Madre de Dios is regionalised and highly organised (Cortes-McPherson, 2020).

Protected areas introduce formal obstacles for mining and enjoy state protection at least in theory, but in practice the efforts to enforce conservation rules against excessive mining extraction have been quite limited (Damonte, 2016; Palmer, 2019; Salo et al., 2016). In part, this is due to the remoteness of the extraction areas from administrative centres. Nevertheless, it has also been argued that the Peruvian state has always considered Madre de Dios an extractive frontier, and the fact that it does not effectively stop or regulate ASM operations in the area reflects this ambition (Damonte, 2016; Salo et al., 2016). In this case, the relations between conservation and mining frontiers are highly competitive. Meanwhile, the state prefers not to prohibit either activity; it can keep on receiving conservation funding and sizeable revenue from eco-tourism (e.g., Kirkby et al., 2011) while ensuring the economic benefits of the gold trade for the regional as well as national economy.

#### 4.4. Ndangui, Gabon

Ndangui refers to a group of three mining communities of 600 inhabitants within the canton of Lassio-Sébè, in the department of Mouloundou, Gabon (Hollestelle, 2012). The communities and their mining sites are located within the Cora Wood Gabon forest concession, managed by the private company Cora Wood Gabon S.A. as part of its 'Forest Concessions under Sustainable Management' (*Concession Forestière sous Aménagement Durable*) programme. They constitute a category of protected areas in Gabon and play an important role in the country's conservation scene; of the 21 million ha of dense forests in Gabon, over 14 million ha are enclosed within 150 forest concessions (Karsenty & Ferron, 2017). In recent years, the former majority of European concession owners have gradually sold their assets in Gabon to Asian investors – including in the Cora Wood Gabon forest concession, formerly owned by an Italian forestry company and sold to a Chinese owner (Karsenty, 2018). In these areas, the forestry company is responsible for managing the sustainable use of the concession according to a wildlife management plan, the requirements of which include preventing 'unsustainable' activities by local communities (Karsenty & Ferron, 2017). This match between conservation and extractivism was implemented through a partnership between the International Tropical Timber Organization, WWF and Ministry of Waters and Forests in Gabon, and it reflects the conservation approach of, for instance, the Wildlife Conservation Society in collaborating with forest companies to manage concessions in Gabon (Ahimin et al., 2019; WCS, 2021).

A 2012 study found that local communities within the Cora Wood Gabon forest concession had subsistence user rights in a strictly limited area, although hunting was banned everywhere (Hollestelle, 2012). Gold was extracted by local miners in the area mainly by panning with very low mechanisation, and it was included as one of the permitted subsistence activities (Hollestelle, 2012). The economic importance of mining at the local level was undeniable, and while it attracted miners, traders and related business owners from outside, the operations were con-

trolled by the local communities. Formalisation attempts by government agents were met with distrust by miners in Ndangui. In their view, the mining cooperatives that the government suggested they form was merely a way of forcing them into employee-worker relationships, which went against a decades-old tradition of organising as independent workers; thus, the miners rejected the idea. As of 2012, the environmental impact of ASM was still moderate due to the very modest level of mechanisation and the small number of miners. However, miners did penetrate ever deeper into the forest, removing soil to be panned, and their growing environmental impacts began to increase tensions between miners and conservation actors, suggesting that perhaps ASM would not be tolerated as a 'subsistence activity' for long (Hollestelle, 2012). By 2021, gold mining and trafficking has increased in Ndangui and the region to the extent that it no longer is managed and tolerated by the forest concession but forcefully controlled by the Ministry of National Defense and the National Agency for National Parks (Gabon Media Time, 2021). E.g. in July 2021, 400 gold miners were arrested in Ndangui being accused of illegal mining and mainly thought to be foreign nationals.

### 5. Conceptualising the double frontiers of mining and conservation

The cases presented above illustrate how mining and conservation commodity frontiers intersect in various ways around the world. This section analyses how the observed territorialisation processes (summarised in Table 4) enable the different types of double frontiers to emerge.

#### 5.1. State-led territorialisation: Competing and synergistic double frontiers

In the large-scale mining and conservation double frontiers in Hwange and Fort Dauphin, both conservation and mining actors seek legitimacy for territorialisation from a single source, namely the state. Both large-scale mining companies and conservation actors negotiate land deals with the state and to lesser extent with local populations. They obtain from the state a mandate to extract resources and commodify nature, decide on acceptable land uses and redraw boundaries (Vandergest & Peluso, 1995). The state maintains their control of the land by force if necessary. Furthermore, in both Hwange and Fort Dauphin the state is a partner in the mining projects, even if only a small shareholder, expecting the foreign investment to boost national economic growth in a vision intensely promoted by the World Bank. This is evident regardless of whether the frontiers are competing or synergistic.

Hwange is an example of the superposition of state authorisations for contradictory land uses, which often occurs when the land governance system is fragmented. The mining frontier supported by the government mining roadmap expanded into Hwange National Park only a few months after a major conservation project supported by the GEF, the World Bank and WWF ended in the area. Both mining and conservation territories were limited and closed; their rules, practices and intended outcomes could not allow the other frontier to co-exist. The result was a competitive double frontier, and since both frontiers were legitimised by the state, the dispute was most logically resolved in court. At the local level, people inhabiting the areas between the conservation and mining territories faced severe impacts from the competitive double frontier as it forced wildlife out of the national park into the fields and settlements. The court decision ended the double frontier in this particular park, possibly easing the human-wildlife conflict, which had existed on a certain level already before the events of 2020 (CNRG, 2020). Thus, the expansion of the mining and conservation

**Table 4**  
Summary of the different types of double frontiers.

Case		Fort Dauphin, Madagascar	Hwange, Zimbabwe	Madre de Dios, Peru	Ndangui, Gabon
Type of territory	Conservation	Limited, partially open	Limited, closed	Limited, both closed and partially open	Limited, partially open
Source of legitimacy for territorialisation	Mining	Limited, closed	Limited, closed	Mobile, open	Mobile, open
	Conservation	State	State	State	State
Why the double frontier exists?	Mining	State	State	State, shadow state, non-state armed groups, emergent structures	Local customary structures, emergent structures
	Conservation	Deal between international conservation and mining networks, including IFIs	Overlapping state authorisations	Mining is illegal in conservation areas, but shadow state and mafia presence jeopardise state intervention	Mining is at least temporarily allowed in the conservation area on the grounds of being a subsistence activity
Main interaction between frontiers		Synergy	Competition	Competition	Co-ignorance
Examples of impacts on local communities		Double land grab	Heightened human-wildlife conflict	Double land grab, but local communities attempting to choose sides and secure land rights	Moderate impact by conservation; multiple, intensifying impacts by ASM

frontiers was not a new phenomenon for local people in the Hwange district. There is little academic evidence available on local people's perspectives on the double frontier in Hwange. In particular, the conservation frontier has been little researched due to the fact that the state, scientists and trophy hunting tourism operators all consider it important to promote a positive image of trophy hunting (Dube, 2019). While this particular case was resolved, it is probable that the coal and conservation frontiers will evolve in the district and will most probably interact in various ways in the future.

In contrast, in Fort Dauphin the dispute between mining and conservation frontiers was not resolved by any specific state institution, even though its territorial manifestation was entirely a state-led operation. The biodiversity offset can be viewed here as a territorial structure, evident in the synergy between powerful international actors and proposed to the Malagasy state with incentives of foreign mining investment and conservation funding. It is a prime example of how conservation, under the neoliberal paradigm, has been shaped to fit the interests of the mining industry in a common extractivist model (Dunlap & Jakobsen, 2020). The result has been a synergistic, internationally initiated and legitimised, state-led double frontier facilitating a double land grab that local communities have not been able to stop. This kind of a double frontier synergy backed up by binding contracts between the frontier actors and institutional and international support may produce long lasting territorial arrangements.

When caught between the re-structuring and land-appropriating power of two frontiers, local communities may find it quite difficult to enforce their land rights by turning to the state. The term 'absent presence of the state' has been used to describe situations where actors representing the state are more present for some actors and interests, particularly those of corporate mining, and less present in regards to others such as their citizens, in particular in peripheral areas where natural resource extraction takes place (Bainton & Skrzypek, 2021). Drastic cases of double land grabs and intensified human-wildlife conflicts indicate that double frontiers can be lethal to local inhabitants. However, local communities may also hold significant power in either resisting or favouring conservation or mining activities. In many cases, local communities, including local elites, have been observed to choose sides and negotiate various forms of collaboration with agents of either or both the frontiers, trying to find a deal that would produce more benefits or the kind of development they desire (Eilenberg, 2015). Cases of successful local resistance to mining

projects throughout the world also highlight the practical importance of obtaining local consent (Kröger, 2020a; Nagar, 2019). It may be even more significant in competitive double frontiers than in a single frontier to obtain local consent – their choice may determine what type of territorialisation will prevail and what type is rejected (e.g., Halvaksz, 2013).

### 5.2. The case of multiple sources of legitimacy: Competing and ignorant double frontiers

At the double frontiers of neoliberal conservation and small- to medium-scale mining, legal pluralism marks the overlapping territorialisations. The territories of conservation function through state approval, whereas mining territorialisations are legitimised by various other structures. Such legal pluralism makes mining frontiers very difficult to control by states and an inconvenient question for conservation actors. Any meaningful negotiation between the frontier actors – international conservation networks and NGOs on one side and a large number of individual miners and small companies on the other – is hampered by the fact that it would necessitate recognising parallel territorial legitimacies on sovereign state land. In viewing artisanal, informal mining as simply an unlawful activity, conservation actors may turn to police force as one of the only practical solutions to maintaining territorial control in the protected area and preventing the territorialising efforts of miners. Whether police force is available to enforce conservation rules is another matter. Lacking it, the very fact of being informal and working through various legitimacies provides the means for ASM frontier expansion (Verbrugge & Geenen, 2019).

The cases of Madre de Dios and Ndangui are vastly different, even though legal pluralism characterises both. In Madre de Dios, where mining is illegal in conservation territories, the double frontier exists for a similar reason as in the case of Hwange, Zimbabwe: state agents have vested interests in expanding both frontiers. The double frontier can be seen historically as a means of state formation – the expansion of state territory in the Amazonian frontier – through both state-supported ASM as well as exclusionary conservation. Similar to Hwange, the main interaction between the frontiers is competition, if not outright conflict, as the mobile mining frontier expands into the, in theory, strictly limited conservation territories. However, unlike in Hwange, in Madre de Dios the state has not issued overlapping permits; instead, the shadow state allows both frontiers to expand. Government agents benefiting clandestinely from the gold trade is a problem throughout the

world (Hilson, 2013; Peluso, 2018). Informal taxes collected at different levels of the value chain ensure the willingness of shadow state agents to allow the frontier to expand, and occasional police raids do little to stop the gold frontier from expanding into conservation territories. Even though competitive by its very nature, the double frontier continues to exist. Existing between the competing forces of the double frontier, local and native peoples in the Madre de Dios area have held several roles. Facing a double land grab, they are one potential source of cheap labour for the gold frontier (Damonte, 2016); however, some groups have also attempted to partner with the conservation frontier in order to restore their land rights.

In Ndangui, a part of the Gabonese gold frontier, miners had refused to formalise their mining activities, and thus, the mining territory was initially legitimised mainly through local customary structures of land access as well as emerging structures that had evolved at the already decades-old frontier. This suggests a frontier expansion that can be characterised in more positive terms as accumulation without dispossession in this particular locale at a distinct historical period. To examine the 2012 situation, the relatively modest environmental impacts of ASM enabled the conservation frontier actors to consider mining as a subsistence activity for which the conservation territory was partly open. Conservation perhaps disturbed and restricted local mining communities, but it did not altogether dispossess them of the land. The interesting feature of the double frontier in Ndangui in 2012 was the lack of both confrontation and cooperation. With ASM being so difficult to control, the open and mobile nature of the ASM mining territory offered the possibility for conservation efforts to overlook the situation and wait for it to pass, so long as the extractive operations remained modest in volume. This creates a new mode of co-existence at the double frontier, namely co-ignorance, marked by temporality and flexibility at both frontiers.

By 2021, it seems that the mining frontier in Ndangui had expanded remarkably with an influx of miners from neighbouring countries switching the double frontier interaction from co-ignorance to competition and conflict. This highlights the temporal dimension of double frontiers; the interaction between the frontiers may change from co-ignorance to competition (Ndangui), or perhaps competition turns to synergy, which has happened at the global scale and materialised in e.g. Fort Dauphin. One frontier may overcome the other (Hwange) but competitive double frontier, such as the one in Madre de Dios, may also exist and evolve for decades in a vast landscape where state and shadow state agents have a stake at both frontiers and the territorialising power is derived from multiple sources including the state and non-state armed groups.

## 6. Conclusions

Conservation and mining frontiers across the world are increasingly overlapping (Asner & Tupayachi, 2017; Cardiff & Andriamanalina, 2011; Farrington, 2005; Villegas et al., 2013), and therefore also academic discussions on frontiers should urgently focus on multiple frontier cases. Conservation and mining frontiers have many dynamics in common, including commodification of nature for value extraction, their attempt to gain control over land and resources, the resulting land grabbing and complicated entanglements with local actors and politics in frontier spaces. While the land grabbing caused by neoliberal conservation and corporate mining activities is often state-driven, differences emerge in the ASM sector since the process of territorialisation takes place via means other than formal, state-approved ownership or management rights. This analysis has directed attention at these various sources of legitimacy for territorialisation and

the types of territories serving as possible explanatory factors for the existence of double frontiers.

Based on four cases, the analysis has identified three main types of double frontiers: competing/conflictive, synergistic and co-ignorant. Interactions at double frontiers are not likely to fall purely into any one of these categories. This is evident when considering the range of local actors and interests involved when global capital meets with local political, social and ecological realities, not forgetting either the various actors who hold several roles (e.g., in the case of shadow states). At double frontiers, as compared to single frontiers, the range of actors and possible interests can be expected to multiply, and therefore, they are always spaces with multiple overlapping tensions and alliances. It is, however, important to build theoretical understandings of the heterogeneous double frontiers since these politically volatile spaces are increasingly prevalent across the globe. The results of the review show that while the alliances between conservation and large-scale mining have been theorised about already quite extensively, the relationship between different types of small-scale mining and conservation and how that changes the impacts on local communities remain largely unaddressed in the literature. Indeed, local communities play heterogeneous and possibly key roles in different double frontier settings, and, like other actors, likely move between different camps and positions over time (Golub, 2014). Further research should focus on those temporally varying roles. More case studies situated in the realities of double frontiers of mining and conservation are needed to complete the observations presented in this article as well as to contribute to the construction of a more elaborate theoretical framework for power contestations within multiple frontier situations.

### *CRedit* authorship contribution statement

**Marketta Vuola:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Funding acquisition.

### Declaration of Competing Interest

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

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