



Contested water- and miningscapes – Explaining the high intensity of water and mining conflicts in a meta-study

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ABSTRACT

Conflicts around access to, control over, and quality of water accompany mining projects all over the globe. Often, they are associated with high intensity as means of contestation range from verbal complaints to protest marches, civil disobedience and violent confrontations. While numerous case studies on water-related mining conflicts exist, scholarship that synthesizes insights remains rare. In order to better understand the dynamics that lead to the escalation of conflicts and to further theory development on the role of, e.g., political economic contexts, hydro-social conditions and social relationships, a systematic overview of the existing empirical evidence is needed.

Our meta-study of 53 water and mining conflicts identifies several combinations of conditions that are tied to large-scale mobilization and the use of civil disobedience measures, sabotage or hunger strikes by environmental defenders. As our results show, raised stakes and ontological differences, e.g. in situations where water is essential for livelihoods and cultural and spiritual practices, play a role, in particular when coupled with a lack of meaningful participation. Discursive or physical coercion by the state or by private security forces also intensify mobilization rather than containing it while the role of international NGOs is more ambiguous. To identify explanatory scenarios, we conducted a two-step, fuzzy-set qualitative comparative analysis (fsQCA) based on data collected in a systematic literature review of peer-reviewed articles and book chapters. Taking its data from published research, our study identifies a geographic bias towards Latin America in academic literature on water and mining conflicts and points out topical blind spots. By looking for conditions that are consistently associated with high-intensity conflicts, it also provides insights on priority areas of engagement for community leaders, policy-makers, and private sector and civil society representatives seeking to avoid the escalation of conflicts.

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1. Introduction

Mining is among the most lucrative but also the most contested industrial activities in the world (Schrecker, Birn, & Aguilera, 2018). Recent dynamics such as a steadily growing demand for mineral resources, decades of liberalization as well as technological innovations have led to a steady expansion of the mineral commodity frontier, in particular in the global South (Bridge, 2004; Conde & Le Billon, 2017; Dougherty, 2016; Mudd, 2007; Muradian, Walter, & Martinez-Alier, 2012). This expansion goes hand in hand with a growing number of mining conflicts that are associated with high levels of mobilization and violence (Conde & Le Billon, 2017; Temper, Del Bene, & Martinez-Alier, 2015). As communication technology improves and increases the speed and volume of information exchange across the globe (Della

Porta & Tarrow, 2005; Kirsch, 2014), these conflicts gain greater visibility and decision-makers from the public and the private sector are increasingly called upon to safeguard natural environments and the rights and interests of people who depend on them.

In nearly all mining conflicts, access to and control over water play a key role (Temper et al., 2015). Mining affects water quantity as well as quality. Extractive operations often occur in water-scarce areas but require large amounts of fresh water (Lottermoser, 2010). Allocating water resources to mining companies can therefore exacerbate conditions of scarcity for other users, and interrupt existing collaborative arrangements. Mining also produces contaminated wastewater that contains heavy metals such as mercury or arsenic, and toxic chemicals like cyanide (ibid.). Depending on how they are stored, mining wastewaters as well as solid tailings pose high risks to communities living in the vicinity or downstream of a mine – tailing dams might leak or be subject to dam breaks with catastrophic impacts; solid tailings might react with rainwater and result in Acid Mine Drainage (Akcil & Koldas,

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2006; Dougherty, 2016). Water resources that have been degraded by such processes threaten the health of communities that rely on these resources for their livelihoods, and the socio-cultural practices that form or actualize place-based identities (De La Cadena, 2015; Escobar, 2001; Robertson, 2006; Schoderer, Dell'Angelo, & Huitema, 2020). The extent to which the bio-chemical, social, economic and psychological/emotional impacts of mining are recognized and pro-actively addressed in water distribution and treatment decisions differs according to national legislation, company cultures, and individual hydrosocial settings (Schrecker et al., 2018). The bulk of transnational efforts to govern mining operations and to improve relations between communities and companies still fails to recognize the social-cultural dimension of water, viewing it predominantly as a biophysical and economic resource (Schoderer et al., 2020).

Thus, there is an urgent need to better understand how water and mining conflicts develop and why these conflicts are associated with a high intensity of mobilization and violence (Navas, Mingorria, & Aguilar-González, 2018; Temper et al., 2015). Most research on the topic focuses on single case studies, investigating dynamics of inclusion and exclusion, of accumulation through dispossession (Harvey, 2004) and dispossession through accumulation (Perreault, 2013) from a political ecology standpoint. As Swyngedouw and Heynen (2003) claim, this dispersion of insights has resulted in a lack of theorization and generalization (e.g. Holifield, Porter, & Walker, 2009). However, systematic synthesis efforts on mining conflicts are still rare (for exceptions, see Conde, 2017; Conde & Le Billon, 2017; Özkaynak et al., 2015, 2012; Haslam & Ary Tanimoune, 2016) and either fail to take explicit account of water, have a limited geographical scope, or focus on synthesizing concepts and arguments rather than conducting a formalized review (Magliocca et al., 2015, 2018). Consequently, a systematic synthesis of water-related mining conflicts has yet to be conducted.

In this paper, we apply a two-step fuzzy-set Qualitative Comparative Analysis (fsQCA) to isolate explanatory pathways for high-intensity water and mining conflicts by identifying combinations of conditions that are consistently associated with the presence or absence of conflict (Ragin, 2008; Schneider & Wagemann, 2012). In doing so, our goal is two-fold. First, we aim to provide insights into the various factors that play a role in how water and mining conflicts develop, to highlight the multidimensionality of these conflicts and the need to recognize them as such. Second, we provide an overview of the current state of scholarship and key concepts that have been discussed in relation to water and mining conflicts, and bring attention to potential geographic biases in case study-based research. We conceptualize 'high intensity' conflicts as situations of mass mobilization or whenever environmental defenders are willing to employ means that expose them to potential physical or legal harm. This covers strategies of civil disobedience (e.g. blocking roads) or violent means of protest (e.g. sabotaging equipment), as well as hunger strikes.

Our paper is organized as such: We start by conceptualizing water and mining conflicts and introducing the various factors that play a role in them, which are later used in the fsQCA to identify explanation pathways. We then give a brief introduction to fsQCA as a method and outline the different steps of data collection, normalization and analysis. In the fourth section, we discuss our results before tying them back to existing debates on water and mining conflicts in Section 5. Section 6 concludes the paper.

2. Water conflicts as frictions between and among overlapping mining- and waterscapes

Environmental conflicts arise where people contest the unequal allocation of burdens and benefits from the use of natural

resources (Martínez-Alier & O'Connor, 1996). However, issues of recognition, for example of the right to self-determination of certain population groups, or of cultural and spiritual meanings associated with landscapes and natural resources also play a role in sparking conflicts (e.g. Ballard & Banks, 2003; Bebbington et al., 2008; De La Cadena, 2010, 2015; Li, 2013). While some scholars view conflict as normatively bad and thus to be avoided, others point to its potential to bring attention to diverging visions and interests and to thereby affect transformative change towards more equitable and ecologically sustainable forms of control over, access to, and use of natural resources (Scheidel, Temper, Demaria, & Martínez-Alier, 2018; Van Laerhoven & Andersson, 2013). Resistance or contestation thus contains two key elements: a position of opposition to existing structures, values, behaviors, discourses, plans and some form of action, be it verbal, cognitive, or physical (Hall et al., 2015; Hollander & Einwohner, 2004; Scott, 1985).

The sibling concepts of water- and miningscapes emphasize the hybrid nature of natural resources, whose material and social relations mutually constitute each other and shape specific legislative, infrastructural, and discursive configurations and practices over time and space, which produce and are produced by power relations (Budds & Hinojosa, 2012; Schoderer, Karthe, Dombrowsky, & Dell'Angelo, 2021). From this perspective, mining- and waterscapes configure each other. Introducing a mining operation with its physical and technical infrastructure, biophysical impacts, its social imaginaries, dynamics of inclusion and exclusion, and discursive legitimations into an existing waterscape shifts not just material flows but also social relationships and meanings associated with water. At the same time, existing water flows, infrastructures, rules and norms impact how mining operations are set up and water-related social imaginaries influence how these operations are perceived. Opposition to mining projects shows that this process of mutual (re)configuration is far from monolithic or linear. Frequently, it is at the point where mining- and waterscapes are layered over each other that the simultaneous existence of multiple imaginaries and the contested nature of social artefacts related to these resources becomes apparent.

Drawing on scholarship on waterscapes and hydro-social territories (e.g. Budds & Hinojosa, 2012; Boelens, Hoogesteger, Swyngedouw, Vos, & Wester, 2016; Linton & Budds, 2014; Ekers & Loftus, 2008), on water conflicts (e.g. Rodríguez-Labajos & Martínez-Alier, 2015; Selby & Hoffmann, 2014) and social movement theory (Della Porta & Tarrow, 2005), as well as on existing syntheses of mining conflicts (especially the excellent reviews by Conde, 2017; Conde & Le Billon, 2017), we identified thirteen conditions that describe the water- and miningscape, the larger political-economic context in which it is embedded, and the specific forms of contestation that take place. We refined the conditions in accordance with the information on water and mining conflicts that make up our dataset to ensure that they present an empirically rooted, comprehensive picture of the water- and miningscapes in question. In the following, we describe the conditions, illustrating why they are relevant for how conflicts develop. We also indicate when a condition is considered to be present in a case study or not, which is essential to operationalize them for the subsequent analysis.

2.1. Describing mining- and waterscapes through hydro-geo-social conditions

2.1.1. Physical water scarcity ("Scarcity")

The notion that scarcity in general and water scarcity in particular promotes conflict among different users is one of the mainstream academic and policy accounts of social-environmental relations (Gleick, 1993; Homer-Dixon, 1994; IPCC, 2014; Ban, 2011). As Selby and Hoffmann (2014:360) put it, "scarce resources are envisaged as challenging livelihoods, fomenting grievances and

competition, and spurring civil and perhaps even inter-state conflict.” The narrative that physical (water) scarcity causes resource conflicts has been challenged, however, due to a lack of empirical evidence (e.g. Gleditsch, 2012; Johnson, Fitzpatrick, & Floyd, 2011; Theisen, 2008), because it obscures political-economic questions of distribution that create conditions of scarcity for some and of abundance for others (e.g. Peluso & Watts, 2001; Mehta, 2001), and on theoretical grounds (Selby & Hoffmann, 2014). As Mehta (2007) shows, physical water scarcity can also be associated with cooperation rather than conflict as water users develop strategies of natural resources management that are adapted to arid or semi-arid conditions. Therefore, while physical water scarcity influences water use and management, it is unclear whether it increases the risk for conflict or not. In our analysis, a case is considered to fulfill the condition for water scarcity whenever scarcity is mentioned in the text, or the case study area is located in arid or semi-arid zones.

2.2. Cultural significance of water (“Cultural”)

Waterscapes are not simply material spaces but are imbued with cultural meaning and emotional attachment through everyday interactions and historical relations between people and water (Conde & Le Billon, 2017). These practices and their historical sedimentation link territories and identities, forming places and place-based identities in a mutually constitutive process (Clammer, Poirier, & Schwimmer, 2004; Murray Li, 2000) and turning specific territories into places that communities consider worth defending (Robertson, 2006; Cater & Keeling, 2013; Avci & Fernandez-Salvador, 2016). This is especially pertinent where water has a spiritual significance and water-related practices actualize one's beliefs. While extractive operations primarily consider water resources as an input to an economic process, the same water resources might be sacred entities that have a life of their own and determine the fortune and misfortune of their constituents, depending on how they interact with them (Boelens, 2014; De La Cadena, 2010, 2015). Such diverging ontologies have implications on how negative impacts on water resources are perceived. If water is considered a living entity, it cannot be divided into elements such as chemical composition, smell, or color that are associated with different degrees of importance for what is considered ‘good quality’. Even in scenarios where no spiritual significance is ascribed to rivers, visible impacts such as discoloring or a bad smell might still impact the sense of place that is tied to the landscape (Schoderer et al., 2021). As such, the cultural and spiritual importance of water has significant implications for how (potential and actual) water degradation from mining operations is experienced and, consequently, for the motivations to resist mining. We score a cultural significance of water to be present whenever it is explicitly mentioned as such or when environmental defenders include indigenous peoples whose ontologies of water contain spiritual elements.

2.3. Clear and visible impact of mining on water (“Impact”)

As Conde and Le Billon (2017) and Conde and Kallis (2012) find in their review, the technical aspect of mining affects conflict likelihood, as open pit mining with its clearly visible impact on the environment increases the likelihood of conflict, compared to other forms with less visible impacts. Similar dynamics apply to the coloring, smell, and taste of water close to the discharge point and changes to the number and abundance of aquatic species, the health of livestock that drinks from open water sources and community members themselves. Communities rarely have access to laboratories to test the quality of the water bodies on which they rely, so they have little exact information on the impacts of nearby

mines on water bodies. However, if indicators that can be measured by one's own senses – such as smell or color – change, then fears about negative impacts of mining on water are – to a certain extent – validated. In this regard, participatory water monitoring where monitoring programs are designed and/or conducted with the input of communities can help to allay fears and build trust (Pareja, Honey-Rosés, Kunz, Fraser, & Xavier, 2018). However, they have also been criticized for privileging a specific understanding of credible environmental knowledge and constraining the “language of contention” (Himley, 2014:1084) to science-based claims and thereby limiting the space for opposition and the capacity of some community members to engage (ibid., Li, 2009). Visible impacts are considered present whenever observed changes to water resources, water-dependent organisms, and the health of livestock or people are mentioned and attributed to mining activities.

2.4. Importance of water for livelihoods (“Livelihood”)

In rural areas, where mining primarily takes place, water is the basis for most livelihoods – agriculture, in particular irrigated crops, animal farming, even tourism relies largely on the availability of sufficiently clean water resources. This holds true for both sedentary and nomadic lifestyles. Water degradation from mining thus poses direct economic risks for communities whose livelihoods depend on water. As several studies show, communities are “more likely to resist when they perceive a threat to their health or their livelihood” (Conde, 2017:82; see also: Kirsch, 2001; Hyndman, 2001; Bury, 2002). Following Perreault (2013), what drives these conflicts is not only accumulation by dispossession (i.e. the enclosure of land for mining purposes) but rather dispossession by accumulation, namely the accumulation of toxins and other pollutants in water resources that communities depend on. For our analysis, we consider this condition present whenever water-reliant livelihoods (such as agriculture, but also animal husbandry or tourism) employ the majority of the population or employ marginal groups in particular.

2.5. Pre-existing tensions (“Tensions”)

As Conde (2017) and Conde and Le Billon (2017) describe, distrust towards the mining company is a key factor in sparking resistance. Prior negative experiences with mining or other forms of large-scale industrial water use shape expectations towards other mining projects and influences perceptions of social and environmental risk (Horowitz, 2010). Prior negative experiences with a mining company – such as spills or contestations over water allocation – that were not resolved satisfactorily also speak to the failure of governmental entities to guarantee environmental standards, which in turn sows doubt about the regulation of these entities for the current project (Dougherty & Olsen, 2014; Muradian, Martinez-Alier, & Correa, 2003; Walter & Martinez-Alier, 2010). We consider pre-existing tensions to be present whenever conflicts with mining companies or negative effects from mining have occurred in the area where contestation is taking place or close by.

2.6. Meaningful participation measures (“Participation”)

Meaningful participation is considered an essential step towards establishing trust between companies and communities (Barton, 2005; Commdev 2008; Conde, 2017; ICMM 2020). Companies and industry-led initiatives often call for participation under the framing of corporate social responsibility (CSR), making a business case out of the benefits of receiving a social license to operate and reducing risks (Hilson, 2002; Schoderer, Dell'Angelo, & Huitema, 2021b), while international organizations, NGOs, and

academics recommend participation both from a rights-based and a business perspective (Ali & Grewal, 2006; OECD 2017, 2011; Schlosberg, 2004; Urkidi & Walter, 2011). However, participation is a broad term that comprises multiple forms of engagement. These differ in the extent to which community opinions and concerns need to be taken into account in final decisions on licensing or in environmental management plans (Walter and Urkidi, 2017). The stage in the process at which participation occurs also varies and so does its inclusivity, i.e. the composition of people involved and the geographic distance from the mine up to which community members are considered affected and therefore allowed to participate, as well as the extent to which information is presented in accessible and culturally appropriate forms. All of these elements have potentially far-reaching impacts on the quality of the participation process and the degree to which it is capable of fostering trust rather than alienating communities or creating conflicts within and between different communities as participation processes create new inequalities (Jenkins & Yakovleva, 2006; Warnaars, 2012).¹ We consider meaningful participation present whenever participation measures are reported that that were viewed as a positive experience by community members either on account of the process design or its outcomes.

2.7. Internal conflicts among protesters ("Internal")

Mining projects promise economic development and employment opportunities. Hence, communities rarely uniformly reject mining. Positionings can be multiple and shift over the course of negotiations between communities and mining companies (Li, 2015; Avci & Fernandez-Salvador, 2016). This illustrates that 'community' does not refer to a homogeneous entity. Rather, the term serves as a placeholder within which divergent subjectivities and interests, heterogeneous experiences and forms of marginalization are aggregated (Agrawal & Gibson, 1999; Conde, 2017), which is also how we employ it in this study. Mining companies often deliberately engineer such shifts in perception by offering bribes or promoting the social-economic benefits that their operations will allegedly engender. Disagreements over mining projects can result in intra-community conflicts (Munhenzva, Chimhete, & Kufakurinani, 2019), creating, re-entrenching or upsetting forms of exclusion and dominance, e.g. between social and economic elites who stand to benefit from mining and ordinary villagers (Jenkins, 2017; Mwanza, 2015; Conde and Kallis, 2012) or vice versa (Andrews et al., 2017), and between people who live in the direct vicinity of mining operations and those further downstream (ibid.). Dougherty and Olsen (2014) show that relational trust – strong bonds between family, friends and neighbors – correlates positively with views opposing mining in Guatemala. However, relational trust can also prevent conflicts from escalating by providing protesters with a sense of security that they will be able to maintain a united front over time until some form of concession to their demands is granted (as illustrated by Jenkins, 2017). Where such security is lacking, protesters might consider measures

with a higher personal risk to gather attention and to force a reaction. We consider internal conflicts to be present when tensions among community members or diverging positions towards mining operations are mentioned.

2.8. National economic reliance on mining ("Extractivism")

States generally take the position of custodians over natural resources within their territory. As they benefit from resource-based revenue, they have an interest in their extraction and often design pro-industry policies to attract investments to facilitate it (Kaup, 2010; Kohl & Farthing, 2012; Acosta, 2013; Gudynas, 2009). Simultaneously, states are regulators and enforcers of environmental law. This creates a contradiction, which sometimes plays out as intra-governmental conflicts between different departments or levels of administration. It has also led to widespread failures in safeguarding environments and people who depend on them as states resolve this contradiction by neglecting their regulation and enforcement duties (Conde & Le Billon, 2017). Especially in areas that are arid or semi-arid, a political economy that is based on natural resources extraction is likely to prioritize the demands of mining companies over those of other users in struggles over water distribution, creating or aggravating water scarcity for them (Salem et al., 2018). As Conde and Le Billon (2017:691) note, in extractivist economies, the state is often relatively absent "as a representative of affected communities and environmental steward" and only selectively present "as the 'sovereign' authority over resources and public enforcer of corporate entitlements". In these settings, communities therefore often place little trust in the state to protect their rights over mining interests. Frequent allegations of corruption in resource rich political economies exacerbates that lack of trust (ibid., Le Billon, 2014; Le Billon, Gamu, & Conde, 2016). We score national economic reliance on mining as present whenever political leaders have proclaimed extraction a key element of the country's economy or when it made up a minimum 5% of GDP at the time of the conflict.

2.9. Marginalization of affected communities ("Marginalization")

Mining tends to occur in rural, sparsely populated areas that are at least geographically disconnected from decision-making centers. Often, this geographical distance translates into a social, political, and economic disconnect to more "central" areas of the country. Marginalization can take many different forms: communities can be excluded from political decision-making mechanisms (Ballard & Banks, 2003) or not have time or resources to participate in the formation of cultural/societal/political discourses (Bebbington, 2007; Blaikie & Brookfield, 1987). Such situations can be the result of or go hand in hand with deliberate discrimination on account of ethnicity or group identity (Navas et al., 2018). Many mining operations take place in territories to which indigenous people lay claim who are frequently at the receiving end of the cultural and structural violence that Navas et al. (2018) describe. Where an effective state is absent, environmental defenders have no recourse to institutionalized complaint mechanisms and lack social or political representation and might therefore view extra-institutional pathways of mobilization and resistance as the only options available to them (Ballard & Banks, 2003; Bebbington, Bebbington, & Bury, 2010; De Echave, Diez, Huber, Revesz, Lanata, & Tanaka, 2009). However, marginalization can also lead to a notion of low self-efficacy (Dougherty & Olsen, 2014), where communities lack belief in their ability to effect change in their lives and thus cede agency to the authorities, technology, or the divine, making resistance less likely. Finally, a lack of education and information could also limit the degree to which community members are able to understand the implications of a mining project as it is

¹ At the international level, the right for indigenous peoples to participate in decision-making on natural resources management has been guaranteed by the United Nations Declaration on the Rights of Indigenous Peoples under the headline of free prior and informed consent (FPIC) (UNDRIP 2007). While often considered a key advancement in securing self-determination rights for indigenous communities, FPIC has also been criticized for lacking an exact definition of the word 'consent', due to which it does not necessarily place decision-making rights with indigenous peoples (Conde & Le Billon, 2017). Another critique aims at its failure to define exactly to whom its stipulations extend or "who counts", as Mahanty and McDermott (2013:410) phrase it. As with all international legislation, the responsibility to enforce FPIC lies with nation states. This can be problematic, as the state is also the recipient of mining-related royalties and thus not necessarily the impartial overseeing entity that Schilling-Vaccaro and Flemmer (2013) determine to be crucial for the success of participation processes.

presented to them (Conde & Kallis, 2012). Marginalization of mining-affected communities is considered present whenever communities lack opportunities to participate in social, political or economic life.

2.10. Dependency of communities on the mine ("Dependence")

In rural areas, mining projects offer employment opportunities, which are often rare. Depending on the scale, the mine might be the primary employer in an area, especially as surrounding land degrades (e.g. due to the formation of dust, lowering groundwater tables or other environmental impacts). Mining projects can also bring economic benefits to other actors such as shopkeepers or nomads who sell milk and meat to workers at the mine (e.g. High, 2013). Through CSR programs, mining projects are often involved in or contribute funding to local development projects. In some cases, this kind of involvement leads to a paternalistic relationship where the mining company takes over the provision of certain public goods for communities, such as the building of roads or even the provision of water (for a critical perspective on this, see Jenkins & Obara, 2006; Jackson, 2018). Some companies also deliberately seek to establish a feeling of identification with the mine in order to reduce the risk of contestation (Conde & Le Billon, 2017; Scott & Bennett, 2014, non-mining related: Fagin, 2013). Conde and Le Billon (2017) find that communities that rely strongly on mining companies to provide income or public services are unlikely to contest operations. We score mining dependency as present whenever mining is considered an important employer in the area, providing jobs to either a majority of residents or a particularly marginal group.

2.11. Alliances with international NGOs ("INGOs")

Increasingly, environmental defenders form alliances with international NGOs. This allows them to jump scales and reach new audiences, such as global civil society, or governments and judiciary of the mine's origin country, which is particularly important when local or national administrations fail to protect community rights and interests. Forming cross-scalar alliances gives visibility to environmental defenders, strengthens their position in negotiations with the mine, and opens up resources for diverse resistance strategies such as court cases in host or origin countries, collaborations between scientists and activists, local referendums etc. (e.g. Walter & Urkidi, 2017; Pigrau, Borràs, Jariá-Manzano, & Cardesa-Salzmann, 2012). Allying with national and international NGOs also allows protesters to increase their knowledge about the global political economic structure into which their struggle is embedded and pertinent national and international legislative frameworks. This can lead to a reframing of the struggle, as protesters link their concerns to national or international discourses (such as climate change, environmental justice etc.), sometimes in a very strategic manner (Buchanan, 2013; Martínez-Alier et al., 2014). Researchers have pointed out the apparent contradiction between locally embedded experiences, place-based framings and global discourses, and the risk of particular knowledges and concerns being pushed aside in favor of interests circulating in international networks (Horowitz, 2016). Others view engagement in such networks as a way to overcome 'militant particularisms' (Harvey et al., 1996) that focus on "local loyalties and identity politics" (Conde, 2017:84). Alliances at the local level can also play a role in forming and maintaining resistance, such as student groups, churches, or NGOs (Bebbington et al., 2008; Holden & Jacobson, 2009). We consider alliances with INGOs to be present whenever INGOs were reportedly involved in the conflict (e.g. through awareness raising, supporting litigation, etc.).

2.12. Questioning development narratives and priorities ("Narratives")

While some protests to mining projects are concerned with technical details and demands (e.g. the location of tailing ponds, groundwater withdrawal rates, or compensation payments), others bring forth critiques that reject mining entirely as a development pathway, "proposing alternative development models, or 'alternatives to development'" (Conde, 2017:81). They express visions of alternative social, cultural and economic projects that reject the neoliberal order inherent in extractivism (ibid.), aiming to create a different system rather than to be better included in or to derive larger benefits from the existing one (Escobar, 2001; Martínez-Alier et al., 2014; Urkidi, 2010; Velicu, 2012). In this context, mining protests often address historical grievances related to land rights and self-determination as well, in particular for indigenous groups (Conde, 2017) and call into question the legitimacy of existing legal frameworks that arbitrate over natural resources use. Such fundamental, systemic critique is often tied to narratives that express ontological difference and a divergent form of valuation, as slogans such as "Defend the Sacred", "Water is Life", or "We are Water" illustrate (e.g. Avci and Fernandez-Salvador, 2016; Özen & Özen, 2017; Penman, 2016; Erb, 2016). It stands to reason that conflicts rooted in fundamental ontological and normative differences are more difficult to solve than those where all parties share an ontological framework and a social-cultural imaginary of development, and that defenders in such settings might reject the constraints of legal frameworks that they view as an artifact of oppression. We consider this condition to be present whenever environmental defenders employ narratives that challenge dominant economic and political paradigms and ontologies.

2.13. Use of coercion by the state, para-military and private security forces ("Coercion")

Organizations that collect data on environmental defenders have identified an increase in violence against those who protest mining projects (e.g. Global Witness, 2017; JCAP, 2016; Ocmal, 2011). Conde (2017:86) speaks of a "growing intolerance" by state administrations towards contestation and an increasing use of repressive measures. Among these are the discursive criminalization of protesters (e.g. branding them as terrorists), legal prosecution, and the deployment of police and even military forces against protesters. In addition, private security forces employed by mining companies play a role in applying force against protesters (JCAP, 2016). A report by the IUCN also links the presence of these guards to an increase in gender-based violence (IUCN, 2020). While the availability of information tracking violence against environmental defenders is hugely important in promoting accountability, there is a glaring gap of 'knowledge from the inside' that explains when and under which conditions state and private security forces choose to escalate violence (Conde, 2017). As most case studies on water and mining conflicts focus on social-hydrological impacts on communities and on strategies for addressing them, filling this gap lies outside the scope of our study. We consider coercion to be present whenever physical, judicial, economic, or discursive means of exercising pressure on environmental defenders are used.

3. Methodology: Applying fsQCA in a meta-study

3.1. Literature search and coding

Our dataset is based on a literature search on Scopus, using the search terms *water*, *mining*/ *extractive*/ *extractivism*/ *extraction* and *conflict*/ *mobilization*/ *mobilisation*/ *contestation*/ *opposition*/ *resistance* and *agua*, *minería*/ *extractivismo* and *conflicto*, combined by

the Boolean operator AND. The initial search was conducted in 2019 and repeated in spring 2021 in order to update the dataset. Excluding papers from the list of results that focused on technical or ecological parameters yielded a corpus of 102 scientific articles or book chapters. From these, we excluded another 21 that did not describe a specific conflict or that only tangentially mentioned the water dimension of the conflict. The remaining 81 papers were reviewed to see how comprehensively they described water and mining conflicts. 15 papers contained no or only vague information on at least a third of the conditions we introduced in the previous section and were excluded from the analysis.²

Among the remaining 66 papers, those that describe the same conflict were merged, leading to a final data set of 53 mining and water conflicts, as Figure 1 illustrates. For our analysis, we distinguish between conflicts that take place before mining operations start (e.g. in the licensing stage) and conflicts that occur after mining is already taking place, since some conditions that are relevant for the latter (e.g. a visible impact on water resources) play no role for the former. Doing so resulted in a dataset on pre-opening conflicts with 23 cases and a dataset on post-opening conflicts with 30 cases.

3.2. fsQCA as a method

QCA finds explanatory patterns for social phenomena by identifying necessary and sufficient conditions or combinations of conditions for a specific outcome. As Figure 2 illustrates, (combinations of) conditions are necessary if, whenever the outcome occurs, the combination of conditions is also present, forming a super-set of the outcome. They are sufficient if, whenever the condition(s) occur, the outcome is also present, forming a sub-set of the outcome.

Identifying relevant conditions to explain an outcome and laying out clear criteria for when they are considered present or absent is therefore an essential step in QCA. These criteria are described in a scoring scheme, which we designed based on the theoretical reflections introduced in section 2 and the information provided in the case studies. It is available in Annex 3. fsQCA recognizes differences in kind – presence vs. absence of a condition or outcome – as well as differences in degree – full vs. partial presence or absence. For that reason, the scoring scheme also includes criteria for partial presence and a definition of the crossover point between presence and absence. It also defines how conditions were scored if information on them was missing in the papers describing the conflict.³ We used the conditions as a codebook and extracted qualitative information on each of them from the 66 papers that our literature review identified, before normalizing this information according to scoring scheme. We then ran an fsQCA for the presence and the absence of the outcome, i.e. high-intensity conflicts as expressed through large-scale mobilization and the application of high-risk means of contestation by environmental defenders, applied the Enhanced Standard Analysis protocol and conducted robustness checks and cluster diagnostics to assess a potential geographic bias of the results (Dusa, 2019; Oana & Schneider, 2018).

As our dataset is derived from published papers and book chapters, the information to which we have access is limited to the topics and considerations that the authors of these papers deemed note-worthy. In addition, the language of publication and the

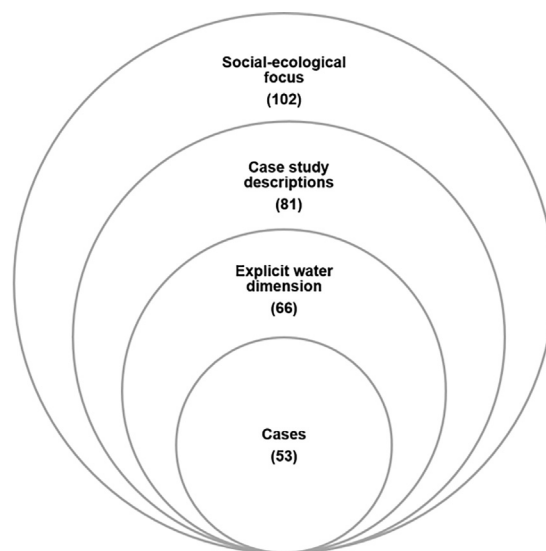


Fig. 1. Final results of literature search and exclusion process.

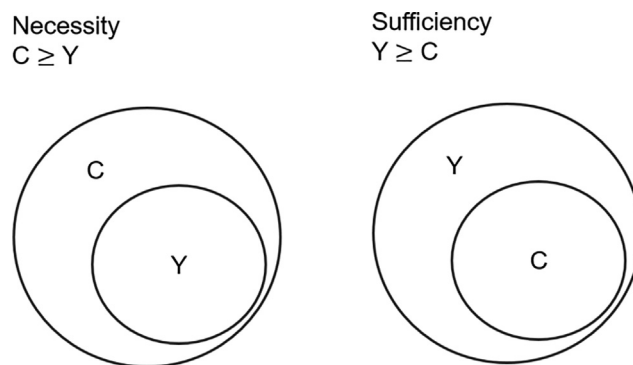


Fig. 2. Venn diagrams for necessity and sufficiency.

dynamics of inclusion and exclusion inherent in the academic publishing process establish boundary conditions for our dataset. It is important to note that QCA establishes relationships of necessity and sufficiency but not causality, which requires case-study based research. QCA “describes the consequences attributable to some treatment but does not achieve [...] the clarification of the mechanisms through which that (potentially) causal relationship holds” (Thomann & Maggetti, 2020:365).

3.3. Remote and proximate conditions

Environmental conflicts are complex and influenced by many factors. However, not all of these factors are situated at the same level of proximity. Instead, some conditions arguably have a more direct effect on how conflicts develop than others. For example, conditions that describe the larger hydrogeological or political economic context are unlikely to directly spark the escalation of conflicts. Rather, they set the scene upon which the conflict plays out, remaining more stable over time and largely outside of the direct sphere of influence of actors. They are therefore considered remote conditions. In contrast, conditions such as internal strife, alliances with INGOs, coercion by the state or private actors, or the narratives employed to contest mining are more volatile. They directly affect, for example, relationships and actor constellations, attitudes towards the legal framework and its legitimacy, as well as how defenders view the chances for conflict resolution. Such factors

² The bibliographic information for these papers is available in Annex 1.

³ Inter-coder variability was assessed by having a student assistant repeat the normalization according to the scheme. In only 5% of all cases did scoring differ in kind, i.e. with one researcher designating a case as a member in a condition and the other as a non-member, illustrating the inter-subjective robustness of the scoring scheme and the assignment of membership.

Table 1

Conditions for fsQCA. Remote conditions are marked in cursive, conditions that are of relevance in reactive conflicts but do not apply to preventive ones are indicated by brackets.

Hydro-social dynamics	Political-economic context	Means of contestation and social relations
- Physical water scarcity - Cultural significance of water [Clear and visible impacts of mining on water] - Importance of water for livelihoods <i>Pre-existing tensions with mining companies</i> - Meaningful participation measures	- National economic reliance on mining <i>Marginalization of affected communities</i> [Dependency of communities on the mine]	- Alliances with International NGOs - Questioning development narco coercion rationes and priorities - Use of coercion by state or private security forces - Internal conflicts among protesters

are considered proximate conditions. For our analysis, the cultural significance of water, clear and visible impacts from mining, the importance of water for livelihoods, meaningful participation, dependency on the mine, alliances with INGOs, the existence of counter-narratives, coercion by the state or private actors and internal conflicts among defenders are considered proximate conditions. Physical water scarcity, pre-existing tensions with mining companies, national-economic reliance on mining, and the marginalization of affected communities were used as remote conditions [Table 1](#).

A two-step QCA accounts for these different levels of proximity. Its first step consists of an analysis of necessity for remote conditions to check whether high-intensity conflicts generally occur within a setting of, for example, water scarcity. If that is the case, necessary conditions are included in the following sufficiency analysis, which identifies those combinations of conditions whose presence is always associated with the presence of the outcome. Running a two-step QCA also addresses problems of over-complexity and limited diversity, which our large set of conditions implies ([Schneider, 2019](#); [Schneider & Wagemann, 2006, 2012](#)). Since our goal is to understand which conditions need to be present in order for conflicts to escalate according to the ensemble of current case study-based knowledge, we are interested in the solution term where every surviving condition is a change-maker. We therefore report and interpret the most parsimonious solution.⁴ For the same reason, we chose high cut-off values (0.9 for the analysis of necessity and sufficiency). This reduces the number of contradictory cases in kind, which means that the solution pathways that we identify are more strongly supported by the empirical evidence from the case studies. The link to the R script, the full solution terms and parameters of fit, as well as truth tables and conservative solutions are provided in [Annex 2](#).

4. Results: Under which conditions to high-intensity water and mining conflicts occur?

The bulk of case study-based research on water and mining conflicts focusses on Latin America. 34 out of the 53 total cases are from this world region, compared to 5 from North America, 4 from Oceania and Asia, respectively, and 3 from Africa and Europe as [Figure 3](#) illustrates. While some of this distribution can be attributed to the fact that we searched in Spanish and English, only 4 case studies were covered by Spanish-speaking publications only. Therefore, even after accounting for the implications of our search languages, the geographic focus on Latin America remains. In conflicts that take place in the planning or the licensing stage of mining projects, intensity remains moderate in about half the cases. In conflicts that occur after the mine has already started operating, the number rises to two thirds of all cases.

⁴ We do not hold directional assumptions since there are multiple examples of conditions exerting influence both facilitating and hindering the outcome. Even conditions such as dependency, which one might assume to contribute to the absence of larger, more violent protests might exert opposing influence and cause protesters to escalate conflicts out of desperation and in order to contest that very dependency.

4.1. High-intensity conflicts in the planning and licensing stage

In our dataset, highly intense conflicts prior to the opening of a mine occur whenever 1) communities are internally conflicted, assign cultural value to water and have not experienced meaningful participation; 2) they experience coercion by the state or private security forces, lack alliances with international NGOs and meaningful participation; or 3) communities assign cultural value to water and have allies among INGOs but did not experience meaningful participation. [Figure 4](#) illustrates the different solution pathways. None of the remote conditions passed the analysis of necessity and were therefore excluded from the sufficiency analysis.⁵ Water-reliant livelihoods were also excluded as they were present in all but two cases. This shows that attempts to prevent mining are almost always tied to water-reliant livelihoods, regardless of whether these attempts employ high- or low-risk measures, and that this condition can therefore not be used to explain diverging conflict intensity.⁶

Scenario One, where communities are internally conflicted, assign cultural value to water and have not experienced meaningful participation, applies to five out of the ten preventive water and mining conflicts in which mass mobilizations occur or environmental defenders choose high-risk measures of protest. All of these five take place in Latin America, two in Chile and three in Peru. This scenario is driven by a combination of high stakes due to the multiple dimensions of water and a lack of social stability. Trust within the community is eroding as goals diverge but the lack of meaningful participation also implies that no trust-building between the community and the mining company or the state agency in charge of the process has occurred.

This is the case in the conflict surrounding the proposed Pascua Lama mine, a bi-national project between Chile and Argentina, owned by Barrick Gold ([Jofré, 2019](#); [Kronenberg, 2013](#); [Salinas & Carmona, 2009](#); [Urkidi, 2010](#); [Urkidi & Walter, 2011](#)). The conflict broke out in 2000 over the first environmental impact study and concerns over damages to glaciers, resulting reduced river flows to the Huasco Valley in Chile and the impacts of cyanide leaching on water quality. It continued until the project was suspended in 2013 and ultimately stopped by a decision of Chile's environmental court in 2020. Environmental defenders included the Daiguita indigenous people living in the Huasco Valley and the agricultural community of Alto del Carmen who viewed their identity and way of life as tied to agricultural practices and water resources and therefore considered the project a threat to their social-economic and cultural survival. These concerns were voiced in the formal consultations and in appeals but not addressed, causing frustration among defenders. Some also argued that information in these events and in the impact study was presented in a very technical, extensive manner that limited the capacity of people to engage

⁵ Two combinations of conditions (state.extractivism + SCARCITY and state.extractivism + TENSIONS) cleared the 0.9 consistency cut-off value. However, as both had a RoN value of 0.5, we excluded them as trivial.

⁶ Skewedness checks showed that this is the only condition for which this applies. For all other conditions, at least 5 out of 23 cases are members or non-members, providing a minimum variety of 20%.

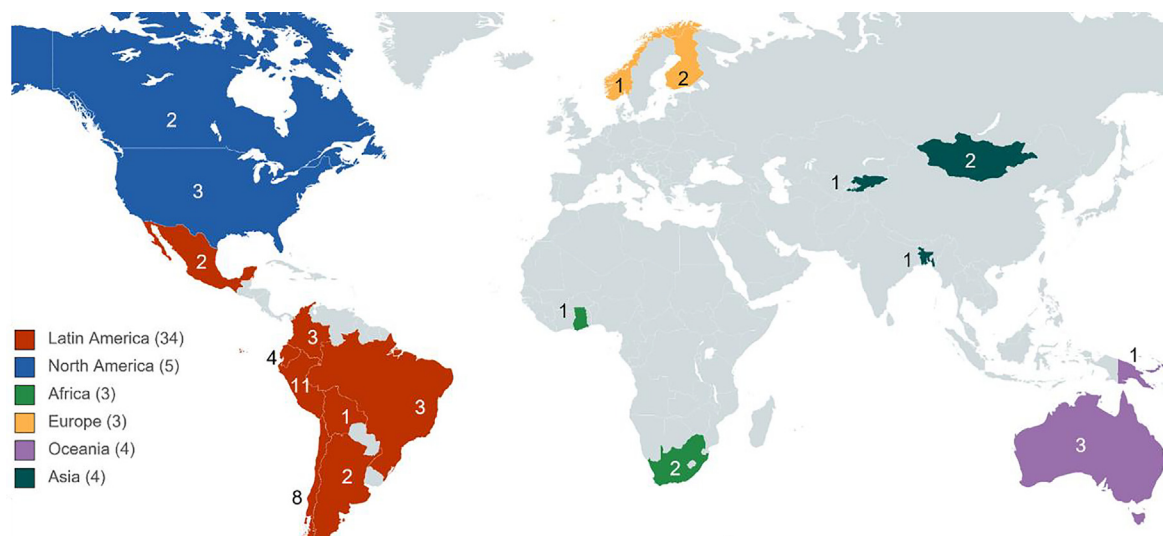


Fig. 3. Geographic composition of dataset.

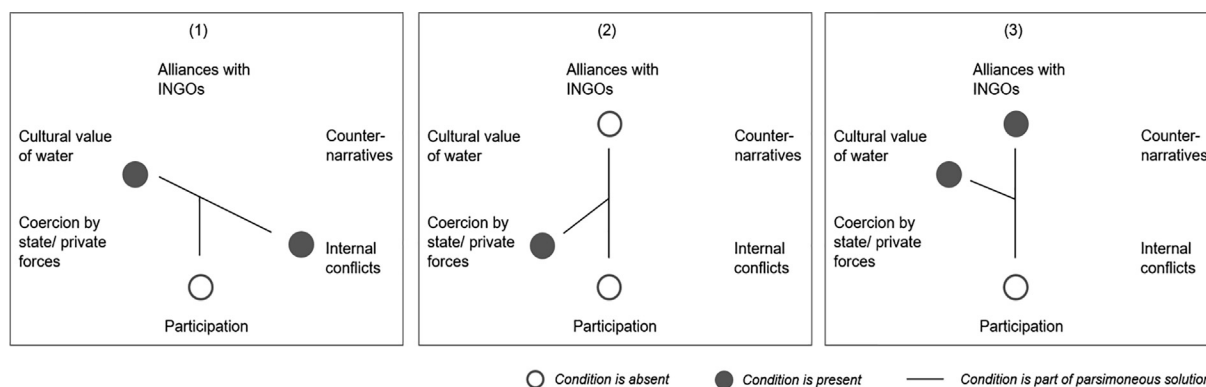


Fig. 4. Combinations of conditions linked to use of non-legal means by environmental defenders in preventive conflicts.

with it (Urkidi, 2010; Urkidi & Walter, 2011). An image campaign by Barrick Gold in 2004, in which the company started projects related to infrastructure, health, and education, and offered compensation payments to larger farmers divided and weakened local opposition. Environmental defenders then linked their concerns to debates on the distribution of costs and benefits from mining that were taking place at the time, alleging that the former are born by local actors while international economic elites reap the latter. This allowed defenders to form alliances with national NGOs and to place their case as a prominent example in a larger context, gaining international recognition and mobilizing people beyond the affected area for country-wide demonstrations (Haslam, 2018; Kronenberg, 2013). Here, defenders responded to internal conflicts that divided opposition by jumping scales while unaddressed concerns from the participation process and the cultural dimension of water use provided arguments that fed into the larger protest narrative and sustained opposition.

Scenario Two, where companies experience coercion by the state or private security forces, lack alliances with international NGOs and meaningful participation, is once again marked by the absence of positive relationships between communities, companies and / or legislators as well as by a lack of international support. This scenario also applies to five out of ten cases in our dataset, three of them located in Peru, one in Chile and one in Bangladesh.

In Peru, Minera Yanacocha announced plans for the copper-gold mine Conga in 2011. Contestation emerged over the environmental impact assessment (Jaskoski, 2014; Paredes Peñafiel & Li, 2017). Because of how it delineated the project's area of influence, several communities who considered themselves affected by the project were excluded from consultation processes. In addition, the area of influence did not include a lagoon (Mamacocha) that residents claimed would be affected by existing plans to drain four other lagoons. Lastly, residents doubted the company's assurance that artificial reservoirs, constructed to compensate for the loss of the lagoons, would deliver sufficient water resources. The company refused to revise the EIA and construction proceeded, even as the national environmental ministry indicated concerns with the EIA. In response, environmental defenders blocked the road and held demonstrations. Riot police was deployed and violent repression led to injuries and the death of a protester, as well as arrests of prominent defenders (The Guardian, 2012). Opposition continued, including a march from the region to the capital of Lima, the purchase of land close to the Mamacocha lagoon and the setting up of a camp to guard it, which was burnt down in 2014 by a special unit of Peru's national police, hired by Yanacocha (Paredes Peñafiel & Li, 2017). In 2016, Newmont, the majority owner of Minera Yanacocha, announced that it had indefinitely abandoned the project.

This case illustrates how opposition is created through dynamics of inclusion and exclusion and the lack of acknowledgement of

community concerns that follow from how participation measures are designed. The perceived non-responsiveness of the company, and later on its deployment of private security forces, reinforced conflict lines and violent repression by state forces presented the state as an enforcer of company interests rather than as a neutral arbiter. In the absence of other allies and avenues (e.g. legal ones) to pursue, environmental defenders responded by taking concrete measures to complicate mining operations (e.g. blocking roads) and sustaining opposition locally and in the capital. The absence of international NGOs plays no role in accounts of the conflict but might have contributed in this perceived lack of avenues to pursue.

Scenario three once again combines a lack of participation with an ontology of water that comprises cultural and/or spiritual value. In contrast to scenario one, this occurs in combination with the presence of international NGOs that support environmental defenders, either directly or through endorsements and awareness raising efforts. The four cases described by this scenario are located in Canada, Peru, Ecuador, and Chile, respectively.

In 2004/2005, members of the Tahltan people opposed plans by Royal Dutch Shell to extract methane gas and by Fortune Minerals to extract coal on their territory in British Columbia, Canada (Roy, 2019). They argued that the manner in which licenses were granted did not respect their right to free, prior and informed consent (FPIC), as companies had failed to consult families who held territorial rights in the prospective mining area. They also contested the legitimacy of agreements reached between the company and male community chiefs, as these agreements ignored their matriarchal systems of governance and therefore lacked legitimacy. Both mining sites were to be located in the headwaters of rivers that community leaders designated as sacred. Mining activities were viewed as threats to these bodies and to fishing, hunting and other forms of living off the land are essential for Tahltan culture and identity, as well as livelihoods. Environmental defenders responded to exploration activities by blocking roads, petitioning the government, and launching a publicity campaign that strategically linked to environmentalist discourses and notions of motherhood that drew national and international attention and support from Amnesty International, Greenpeace, Friends of the Earth and the Sierra Club. By 2012, Royal Dutch Shell abandoned its plans for drilling and in 2015, the government of British Columbia bought back those licenses from Fortune Minerals that lay within the contested territory. In this case, the involvement of INGOs took place simultaneously with direct action such as blocking roads. It led to a particular framing of the conflict that deliberately deployed discourses around indigeneity and the environment that drew on cultural practices and meanings to exert pressure on the regional government and on extractive companies.

4.1.1. When do mobilization and protest measures remain moderate?

Understanding what causes defenders to mobilize on a larger scale and to choose higher risk measures of protest also begets the question which combination of conditions can prevent conflicts from escalating in this manner. As QCA does not assume symmetrical relationships between the presence and the absence of an outcome, a separate analysis is necessary to answer this question. Here, the analysis produces three different solution terms that equally explain the absence of escalation, resulting in model ambiguity. Shared among all three solutions are two combination of conditions: a lack of cultural values attached to water coupled with a lack of coercion; or coupled with the presence of international NGOs.

This indicates that situations where the different actors' understandings of water are compatible serves to contain dissent within the legal framework, as long as it is combined with either state and private actors respecting the opposition of environmental defend-

ers or with the presence of international allies that raise awareness for the demands of defenders and hold state and private actors accountable. The first scenario covers seven cases out of the thirteen where conflicts do not escalate, all but one of them located in Latin America. The second scenario covers two cases, located in Argentina and Mexico, respectively.⁷

4.2. High-intensity conflicts in the operating stage

In situations where the mine is already operating, mass mobilization occurs or defenders choose high-risk means whenever their livelihoods depend highly on water resources, they experience marginalization and coercion by state or private forces and depend on the mine, as illustrated by Figure 5. It covers two thirds of all cases where protesters choose non-legal means, five of them located in Latin America and one in Mongolia. Visible impacts of mining and meaningful participation were excluded from the analysis, as visible impacts are present in all but one case and meaningful participation is present in only six cases out of 30. This implies that they are present/absent irrespective of conflict intensity and can therefore not be used to explain it.

The solution term describes a pressure cooker scenario, where physical or discursive efforts to dismiss and contain contestation play out on a terrain that is already marked by background pressures such as economic, political or social marginalization. Communities rely on water-dependent livelihoods but also on mining operations for jobs or social services such as providing infrastructure, sometimes even water supply. This handing over of service provision to private actors and the experience of marginalization mean that communities have little reason to expect state actors to intervene on their behalf in the conflict, even when state actors are not the ones actively exerting pressure to contain dissent.

In Mongolia, the so-called River Movement emerged in the early 2000 s to protest mining-related water degradation (Byambajav, 2015; Schoderer et al., 2021). Led by semi-nomadic pastoralists, the movement involved petitions, educational events, and a 4-week long protest march along the Ongi river. Semi-nomadic pastoralists in Mongolia often live below the poverty line, experience a lack of formal education and a general disconnect from political decision-making. Pastoralists rely on rivers to water their animals and for hygienic and sometimes even drinking purposes and are thus directly affected by water degradation from mining. However, mines also contribute to so-called local development funds in rural areas, providing infrastructure as well as opportunities for pastoralists to sell milk and meat. Having been branded as terrorists by the state, environmental defenders instead framed themselves as patriots, concerned with the integrity of the natural environment and the protection of pastoralist livelihoods as elements of cultural heritage. Defenders organized their opposition at the national level into a so-called environmental council that lobbied for legislative changes but other defenders also blocked a road for several months, went on a hunger strike and orchestrated an event where horsemen with bows rode up to the Parliament, for which several of them were arrested (Byambajav, 2012). In 2009, a law was passed that prohibits mining in riverbeds, which has been attributed at least in parts to the efforts of defenders. Arguably, in this case, the importance of water for pastoralists' livelihoods was more directly relevant than the dependency on the mine. Attempts by the state to coerce defenders into giving up their opposition were answered by establishing a counter-discourse around cultural heritage protection. They also incen-

⁷ The full solution term covers all but one case in which environmental defenders stay within the legal framework and all but one case survive the robustness checks.

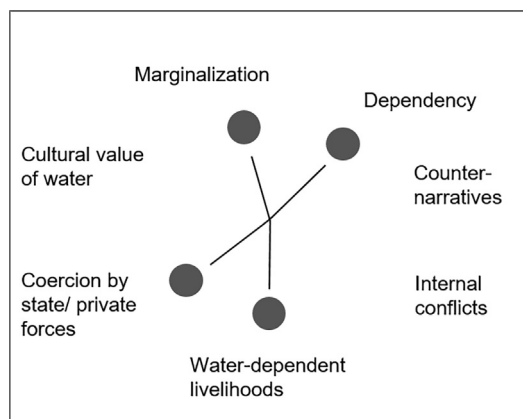


Fig. 5. Combinations of conditions linked to use of non-legal means by environmental defenders in reactive conflicts.

tivized a consolidation of opposition into organized structures on the one hand, and higher-risk measures to draw public attention on the other.

4.2.1. When do mobilization and protest measures remain moderate?

Explaining why conflicts remain at low intensity when contestation surrounds already existing operations is far less straightforward. The parsimonious solution is ambiguous, producing nine models that equally fit the data and contain ten solution terms overall. They explain seventeen out of the 20 cases in which contestation remains within the legal framework. However, two cases within the dataset contradict the solution statement, meaning that the conditions apply but protesters still use non-legal measures. In addition, 40% of the explained cases do not hold up to the robustness test, indicating that with the existing dataset and the conditions we have chosen, we cannot explain particularly well why environmental defender stay within the legal framework in conflicts that occur once a mine is already operating.

5. Contextualizing results, implications for debates on mining and water conflicts

Our results illustrate the complex nature of water and mining conflicts and the variety of factors that interact to shape their dynamics. Contrary to the popular notion that water scarcity begets conflict (Gleick, 1993; Homer-Dixon, 1994; IPCC, 2014; Ban, 2011), this condition plays no role in any of the solution terms. Instead, conditions that are related to social relationships (e.g. internal conflicts) and imaginaries (e.g. the ontologies in which water holds a spiritual dimension) have major influence, showing that in order to understand how conflicts develop, investigating processes of social construction is essential. Simultaneously, the significance of water-based livelihoods, for example, in explaining not just contestation measures but forming the backdrop for contestation in general illustrates the need to take account of material and economic conditions as well. Our results therefore indicate very clearly that a comprehensive look at the material as well as the social dimension of water- and miningscapes is needed in order to understand why and how contestation emerges and develops, rather than focusing on single factors in isolation.

Water carries cultural and spiritual significance in two out of three solution terms for conflicts in the pre-operations stage where high mobilization occurs. Conversely, it represents a mostly ecological and/or economic good in the cases where the means of contestation remain within legal boundaries, illustrating that diverging ontologies influence the dynamics of water and mining conflicts (Li, 2013; Paredes Penafiel & Li, 2019). Both of these sce-

narios also illustrate that cultural practices and meanings provide an important discursive resource to link protests to larger national or international debates to mobilize attention. In both scenarios, ontological differences are coupled with a lack of meaningful participation. This suggests that participation processes where such differences could be negotiated either do not take place or that they are incapable of bridging them, e.g. because they are designed in a manner that does not require companies to follow up on community concerns or to acknowledge opposition or because of which communities and community members are included or excluded in the process. Participation allows for the articulation of diverging imaginaries and interests but it cannot manufacture consent. Where imaginaries and interests are incompatible, negotiations do not necessarily end in agreement. In these instances, the political nature of water and mining conflicts becomes apparent and the limits of participation measures are brought to light (Sosa & Zwarteveen, 2016).

The absence of meaningful participation is linked to all solution terms where conflicts escalate. However, we also see that meaningful participation is not part of the shared solution terms for cases where conflicts remain at low intensity. This illustrates that while participation is a prerequisite, it is not a guarantee for low-intensity conflicts. Our results therefore underscore the importance of research that investigates under which conditions participation succeeds in building trust and understanding and how participation measures can be geared towards this outcome rather than being deployed as a tool to contain dissent (Frederiksen & Himley, 2020; Himley, 2014; Schilling-Vacaflor, 2017).

Internal conflicts among mining-affected communities are part of the solution term for conflicts at the planning and licensing stage. In more than a third of the cases in our dataset, community members pursue diverging goals. Sometimes, such divisions are deliberately produced or exacerbated by interventions from mining companies. This shows the contested nature of mining- and waterscapes that is not new or brought about by external actors but rather always already present as an intrinsic feature of social-material space. It emphasizes the need to take account of group dynamics in order to understand how conflicts develop. Decision-making at all levels therefore has to recognize that communities are groups of individuals rather than unitary actors who unanimously pursue one single goal, as multiple scholars have pointed out (e.g. Conde & Le Billon, 2017; Sosa & Zwarteveen, 2016; Li 2013, 2015).

Simultaneously, coercion by the state or by private forces plays a role in explaining the mass mobilization and the use of higher-risk means by environmental defenders in conflicts that occur prior and post opening the mine. Its absence, on the other hand, is linked to forms of contestation that remain moderate in both datasets. This illustrates that applying coercion does not work as a deterrent for contestation, rather it reinforces opposition. It also emphasizes the importance of states maintaining their role as impartial arbiters in order to ensure the integrity of the legal framework. Where state actors apply pressure on behalf of private interests, the state vacates this role and societal artefacts that are associated with it – such as legal frameworks – also become suspect of partiality. This is true both for direct and for discursive acts of violence and criminalization. As the edited volume by Menton and Le Billon (2021) emphasizes, the persecution faced by environmental defenders constitutes a violation “of rights duty borne by governments and companies”, as well as “an important and grievous dimension of environmental politics” (Le Billon & Menton, 2021:2). Our datasets indicate that in almost half of all cases, defenders experience either discursive or direct violence, illustrating the danger that contesting extractive operations presents.

Where states refuse to or are incapable of safeguarding the rights of their citizens, international NGOs, networks or judiciary

bodies can step in to exert pressure on state actors and companies. However, international NGOs play a double-edged role in this context. While they can raise awareness and protect defenders by giving them visibility and (re)establishing accountability, as well as support legal struggles, they are often themselves entrenched in bureaucratic structures and forms of cooperation with governmental administrations, international donors or extractive companies that prevent them from engaging decisively and comprehensively in order to protect defenders (Grant & Le Billon, 2021; Menton & Gilbert, 2021). As our case study example shows, INGO involvement sometimes happens in parallel to higher-intensity measures such as road blockages. This shows that while resources provided by INGOs (such as visibility and legal support) promise important long-term benefits, they do help in situations where the threat is perceived as immediate and irreversible (e.g. when vehicles arrive to drain a lagoon). In addition, INGOs often get involved only after a certain level of escalation has already been reached, illustrating that their presence does not necessarily prevent conflicts from escalating in the first place. Unfortunately, ethnographic insights from within INGOs that shed light on their politics of engagement are still a rarity.

A similar knowledge gap exists on the considerations and decision-making processes within the state apparatus that lead to state actors applying or condoning coercion against environmental defenders. While scholarship in recent years has begun to address a similar knowledge gap on environmental management from the perspective of extractive companies (most notably Welker, 2014, also Kunz, Kastle, & Moran, 2017), decision-making in the public sector on extractive industries and contestations thereof remains a black box. Attempts to establish explanations in our own dataset (i.e. by turning “coercion” into the outcome to be explained) did not produce intelligible results. Purely on a descriptive level, however, there are only three cases in the entire dataset where environmental defenders are subjected to violence by state or paramilitary forces in political economies that do not explicitly support extraction, compared to 20 where extractivist political economies and violence against environmental defenders occur in conjunction. The so-called Geneva Roadmap outlines policy recommendations to protect environmental defenders, in line with the UN Human Rights Council Resolution 40/11 (Bille Larsen & Lador, 2021). Among them are the creation of national human rights institutions and the promotion of accountability. To support the implementation of the resolution and the roadmap, case-study based research is urgently needed that identifies barriers to key topics such as accountability in specific social, cultural and political contexts across scales, and that provides insights on how decisions are made on extractive projects and the contestations that they spark.

As Frederiksen and Himley (2020) note, “the geography of critical research does not map evenly onto the geography of extraction” (ibid:60). This can in part be attributed to a general tendency among academics to focus on extractive spaces where conflict is visible and to, in turn, neglect spaces where dissent is contained (Furnaro, 2019, Murray Li as quoted by Frederiksen & Himley, 2020). Our research underscores this assessment as the keyword search produced very scarce results that engaged with conflictive settings where few overt forms of resistance were present. Interestingly, the geographical bias towards Latin America in our dataset contrasts with the geographical distribution of water and mining conflicts reported in the Environmental Justice Atlas, an online platform where academics and activists can enter information (Temper et al., 2015). While the bulk of cases on this platform is still located in Latin America, cases in Asia make up nearly 30% and roughly one seventh of reported cases take place in Africa. This speaks to the fact that the geographies of academic attention do not necessarily reflect the geographies of water and mining conflicts, either. In return, this sparks questions related to the politics

of academic attention, which have to do with the accessibility of funding but also of linguistic, geographic and social-cultural contexts, and with the organization of national science systems that might or might not lend themselves to researchers conducting social-environmental studies in their own countries.

6. Conclusion

Our study presents the first systematic review and synthesis of water and mining conflicts. It illustrates the usefulness of applying a qualitative comparative analysis to synthesize information in a replicable and robust manner and to assess the extent to which explanatory patterns observed in single case studies hold beyond that particular context. We find that conflicts in the planning stage of protests take on high intensity whenever a) communities are internally conflicted about their stance towards mining, assign a cultural and spiritual value to water, and were not given a chance to meaningfully participate in the planning and/or decision-making process; b) no participation occurred, environmental defenders experience direct or discursive violence by state or paramilitary forces and have no alliances with international NGOs; c) communities assign a cultural and spiritual value to water and were not given a chance to meaningfully participate but they are connected to international NGOs. When mines are already operating, environmental defenders choose higher-risk means or mobilize in larger numbers in situations where having access to sufficient amounts of water is essential for their livelihoods, they experience political, economic or social marginalization that leaves them dependent on the mine for economic benefits but also for infrastructure measures and public service provision, and state actors or paramilitary forces use coercive strategies to contain protests. These results are consistent throughout the dataset, illustrating that the explanatory pathways that we have identified apply beyond single case studies.

Further research in a mixed method design could shed light on the exact causal mechanisms that case conflicts to escalate under these conditions. Here, a QCA can identify typical cases for the solution terms that are then investigated in in-depth case studies (Schneider and Rohlfing, 2019). Additional research on the dynamics of publishing on water and mining conflicts could provide insights on the geographic discrepancies mentioned above, as well as on the considerations that shape what kind of information is shared through publications and what remains buried in field notes and interview transcripts.

Our results make an original contribution to the literature on natural resource governance and on environmental conflicts, illustrating the importance of social relationships and imaginaries, as well as political economic contexts in order to understand how conflicts develop. They underscore the critical nature of meaningful participation processes that allow communities to articulate diverging interests and meanings associated with water and, importantly, to see this articulation taken into account. Emphasizing the link between physical and discursive violence perpetrated by the state or paramilitary actors and the further escalation of conflicts, our results also show that states have to fulfill their rights duty towards environmental defenders. In order to guarantee the integrity of the legal framework that is supposed to arbitrate the conflicts, it is critical that state actors remain neutral actors in resource related conflicts rather than presenting themselves as allies to extractive interests.

CRedit authorship contribution statement

Mirja Schoderer: Conceptualization, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft. **Marlen Ott:** Investigation.

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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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.worlddev.2022.105888>.

References

- Acosta, A. (2013). Extractivism and neo extractivism: Two sides of the same curse. In *Beyond Development: Alternative Visions from Latin America*.
- Agrawal, A., & Gibson, C. C. (1999). Enchantment and disenchantment: The role of community in natural resource conservation. *World Development*, 27(4), 629–649. [https://doi.org/10.1016/S0305-750X\(98\)00161-2](https://doi.org/10.1016/S0305-750X(98)00161-2).
- Akcil, A., & Koldas, S. (2006). Acid Mine Drainage (AMD): Causes, treatment and case studies. *Journal of Cleaner Production*, 14(12–13), 1139–1145. <https://doi.org/10.1016/j.jclepro.2004.09.006>.
- Ali, S. H., & Grewal, A. S. (2006). The ecology and economy of indigenous resistance: Divergent perspectives on mining in New Caledonia. *Contemp. Pacific*, 18, 361–392.
- Andrews, T., Elizalde, B., Le Billon, P., Oh, C. H., Reyes, D., & Thomson, I. (2017). The rise in conflict associated with mining operations: What lies beneath. *Canadian International Resources and Development Institute (CIRDI)*, 1–127.
- Avci, D., & Fernández-Salvador, C. (2016). Territorial dynamics and local resistance: Two mining conflicts in Ecuador compared. *The Extractive Industries and Society*, 3(4), 912–921.
- Ballard, C., & Banks, G. (2003). Resource wars: The anthropology of mining. *Annual Review of Anthropology*, 32, 287–313. <https://doi.org/10.1146/annurev.anthro.32.061002.093116>.
- Ban, K. -M. (2011). Security Council, in Statement Says “Contextual Information” on Possible Security – Implications of Climate Change Important When Climate Impacts Drive Conflict. <http://www.un.org/News/Press/docs/2011/sc10332.doc.htm>.
- Barton, B. D. (2005). *A Global/Local approach to conflict resolution in the mining sector: The case of the Tintaya dialogue table*. Fletcher School: Tufts University, Boston, MA.
- Bebbington, A., Bebbington, D. H., & Bury, J. (2010). Federating and defending: Water, territory and extraction in the Andes. In R. Boelens, D. H. Getches, & J. A. G. Gil (Eds.), *Out of the Mainstream: Water Rights, Politics and Identity* (pp. 307–327). Earthscan.
- Bebbington, A. (2007). Social Movements and the Politicization of Chronic Poverty. *Development and Change*, 38(5), 793–818. <https://doi.org/10.1111/j.1467-7660.2007.00434.x>.
- Bebbington, A., Humphreys Bebbington, D., Bury, J., Langan, J., Muñoz, J. P., & Scurrah, M. (2008). Mining and social movements: struggles over livelihood and rural territorial development in the andes. *World Development*, 36(12). <https://doi.org/10.1016/j.worlddev.2007.11.016>.
- Bille Larsen, P., & Lador, Y. (2021). The Geneva Roadmap 40/11 and the power of connecting solutions. *Environmental Defenders: Deadly Struggles for Life and Territory*, 90.
- Blaikie, P., & Brookfield, H. (1987). *Land Degradation and Society*. Routledge.
- Boelens, R. (2014). Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands. *Geoforum*. <https://doi.org/10.1016/j.geoforum.2013.02.008>.
- Boelens, R., Hoogesteger, J., Swyngedouw, E., Vos, J., & Wester, P. (2016). Hydrosocial territories: A political ecology perspective. *Water International*, 41(1). <https://doi.org/10.1080/02508060.2016.1134898>.
- Bridge, G. (2004). Mapping the bonanza: Geographies of mining investment in an era of neoliberal reform. *Professional Geographer*. <https://doi.org/10.1111/j.0033-0124.2004.05630.009.x>.
- Buchanan, K. S. (2013). Contested discourses, knowledge, and socio-environmental conflict in Ecuador. *Environmental Science and Policy*, 30, 19–25.
- Budds, J., & Hinojosa, L. (2012). Restructuring and rescaling water governance in mining contexts: The co-production of waterscapes in Peru. *Water Alternatives*, 5(1), 119–139.
- Bury, J. T. (2002). Livelihoods, Mining and Peasant Protests in the Peruvian Andes. *Journal of Latin American Geography*. <https://doi.org/10.1353/jag.2007.0018>.
- Byambajav, D. (2015). The river movements' struggle in mongolia. *Social Movement Studies*, 14(1), 92–97.
- Byambajav, D. (2012). Mobilizing against dispossession: Gold mining and a local resistance movement in Mongolia. *北方人文研究*, 5, 13–32.
- Cater, T., & Keeling, A. (2013). “That’s where our future came from”: Mining, landscape, and memory in Rankin Inlet, Nunavut. In: *Etudes Inuit Studies*. 10.7202/1025710ar.
- Clammer, J., Poirier, S., & Schwimmer, E. (2004). *Figured worlds : Ontological obstacles in intercultural relations*. University of Toronto Press.
- Commdev (2008). Managing Risk and Maintaining License to Operate: Participatory Planning and Monitoring in the Extractive Industries.
- Conde, M. (2017). Resistance to mining: A review. *Ecological Economics*. <https://doi.org/10.1016/j.ecolecon.2016.08.025>.
- Conde, M., & Kallis, G. (2012). The global uranium rush and its Africa frontier. Effects, reactions and social movements in Namibia. *Global Environmental Change*, 22(3), 596–610.
- Conde, M., & Le Billon, P. (2017). Why do some communities resist mining projects while others do not? *Extractive Industries and Society*. <https://doi.org/10.1016/j.exis.2017.04.009>.
- De Echave, J., Diez, A., Huber, L., Revesz, B., Lanata, X.R., Tanaka, M., 2009. Minería y Conflicto Social. Serie Minería y Sociedad, vol. 5. Instituto de Estudios Peruanos, Lima.
- De La Cadena, M. (2015). *Earth Beings: Ecologies of Practice Across Andean Worlds*. Duke University Press.
- De La Cadena, M. (2010). Indigenous cosmopolitics in the andes: Conceptual reflections beyond “politics”. *Cultural Anthropology*. <https://doi.org/10.1111/j.1548-1360.2010.01061.x>.
- Della Porta, D., & Tarrow, S. (2005). Transnational processes and social activism: An introduction. *Transnational Protest and Global Activism*, 1.
- Dougherty, M. L. (2016). From global peripheries to the earth’s core. In K. Deonandan & M. L. Dougherty (Eds.), *Mining in Latin America* (pp. 3–24). London: Routledge. <https://doi.org/10.4324/9781315686226-1>.
- Dougherty, M. L., & Olsen, T. D. (2014). “They have good devices”: Trust, mining, and the microsociology of environmental decision-making. *Journal of Cleaner Production*, 84, 183–192.
- Dusa, A. (2019). *QCA with R. A Comprehensive Resource*: Springer International Publishing.
- Ekers, M., & Loftus, A. (2008). The power of water: Developing dialogues between Foucault and Gramsci. *Environment and Planning D: Society and Space*. <https://doi.org/10.1068/d5907>.
- Erb, M. (2016). Mining and the conflict over values in Nusa Tenggara Timur Province, Eastern Indonesia. *Extractive Industries and Society*. 10.1016/j.exis.2016.03.003.
- Escobar, A. (2001). Culture sits in places: Reflections on globalism and subaltern strategies of localization. *Political Geography*. [https://doi.org/10.1016/S0962-6298\(00\)00064-0](https://doi.org/10.1016/S0962-6298(00)00064-0).
- Fagin, D. (2013). *Tom’s River. A Story of Science and Salvation*: Random House.
- Frederiksen, T., & Himley, M. (2020). Tactics of dispossession: Access, power, and subjectivity at the extractive frontier. *Transactions of the Institute of British Geographers*, 45(1), 50–64.
- Furnaro, A. (2019). Hegemony and passivity in mining regions: Containing dissent in north-central Chile. *The Extractive Industries and Society*, 6(1), 215–222.
- Gleditsch, N. P. (2012). Whither the weather? Climate change and conflict. *Journal of Peace Research*, 49(1), 3–9. <https://doi.org/10.1177/0022343311431288>.
- Gleick, P. H. (1993). Water and Conflict: Fresh Water Resources and International Security. *International Security*, 18(1), 79–112. <https://doi.org/10.2307/2539033>.
- Witness, G. (2017). Defenders of the Earth. *Global Killings of Land and Environmental Defenders in 2016*.
- Grant, H., & Le Billon, P. (2021). Unrooted responses: Addressing violence against environmental and land defenders. *Environment and Planning C: Politics and Space*, 39(1), 132–151.
- Gudynas, E. (2009). Diez tesis urgentes sobre el nuevo extractivismo. Contextos y demandas bajo el progresismo sudamericano actual. In J. Schultdt & E. Al. (Eds.), *Extractivismo, Política y Sociedad* (pp. 187–225). CAAP/CLAES.
- Hall, R., Edelman, M., Borrás, S. M., Soones, I., White, B., & Wolford, W. (2015). Resistance, acquiescence or incorporation? An introduction to land grabbing and political reactions ‘from below’. *Journal of Peasant Studies*, 42(3–4), 467–488. <https://doi.org/10.1080/03066150.2015.1036746>.
- Harvey, D. (2004). The “new” imperialism. Accumulation by dispossession. *Socialist Register*, 40, 63–87.
- Harvey, D. J., Merry, A. H., Royle, L., Campbell, M. P., & Rudd, P. M. (1996). *Justice, nature & the geography of difference*.
- Haslam, P. A. (2018). Beyond voluntary: state-firm bargaining over corporate social responsibilities in mining. *Review of International Political Economy*, 25(3), 418–440.
- Haslam, P. A., & Ary Tanimoune, N. (2016). The Determinants of Social Conflict in the Latin American Mining Sector: New Evidence with Quantitative Data. *World Development*, 78, 401–419. <https://doi.org/10.1016/j.worlddev.2015.10.020>.
- High, M. M. (2013). Polluted money, polluted wealth: Emerging regimes of value in the Mongolian gold rush. *American Ethnologist*. <https://doi.org/10.1111/amet.12047>.

- Hilson, G. (2002). An overview of land use conflicts in mining communities. *Land Use Policy*, 19(1), 65–73. [https://doi.org/10.1016/S0264-8377\(01\)00043-6](https://doi.org/10.1016/S0264-8377(01)00043-6).
- Himley, M. (2014). Monitoring the impacts of extraction: Science and participation in the governance of mining in Peru. *Environment and Planning A: Economy and Space*, 46, 1069–1087. <https://doi.org/10.1068/a45631>.
- Holden, W. N., & Jacobson, R. D. (2009). Ecclesial opposition to nonferrous mining in Guatemala: Neoliberalism meets the church of the poor in a shattered society. *The Canadian Geographer / Le Géographe Canadien*, 53(2), 145–164. <https://doi.org/10.1111/j.1541-0064.2009.00251.x>.
- Holifield, R., Porter, M., & Walker, G. (2009). Introduction: Spaces of environmental justice: Frameworks for critical engagement. *Antipode*, 41(4), 591–612. <https://doi.org/10.1111/j.1467-8330.2009.00690.x>.
- Hollander, J. A., & Einwohner, R. L. (2004). Conceptualizing resistance. *Sociological Forum*, 19(4).
- Homer-Dixon, T. F. (1994). *Environment, scarcity, and violence*. Princeton University Press.
- Horowitz, L. S. (2010). "Twenty years is yesterday": Science, multinational mining, and the political ecology of trust in New Caledonia. *Geoforum*, 41(4), 617–626.
- Horowitz, L. S. (2016). Rhizomic resistance meets arborescent assemblage: UNESCO world heritage and the disempowerment of indigenous activism in New Caledonia. *Annals of the American Association of Geographers*, 106(1), 167–185. <https://doi.org/10.1080/00045608.2015.1090270>.
- Hyndman, D. (2001). Academic responsibilities and representation of the Ok Tedi crisis in postcolonial Papua New Guinea. *Contemporary Pacific*. <https://doi.org/10.1353/cp.2001.0014>.
- ICMM. (2020). *Mining Principles*. <https://www.icmm.com/en-gb/about-us/member-requirements/mining-principles>.
- IPCC (2014). *Fifth Assessment Report*. Cambridge University Press.
- IUCN (2020). Gender-based violence and environment linkages: The violence of inequality. *International Union for Conservation of Nature (IUCN)*. <https://doi.org/10.2305/iucn.ch.2020.03.en>.
- Jackson, S. L. (2018). Abstracting water to extract minerals in Mongolia's South Gobi Province. *Water Alternatives*, 11(2), 336–356.
- Jaskoski, M. (2014). Environmental licensing and conflict in Peru's mining sector: A path-dependent analysis. *World Development*, 64, 873–883.
- Jenkins, H., & Obara, L. (2006). *Corporate Social Responsibility (CSR) in the mining industry - the risk of community dependency*. Queen's University Belfast.
- Jenkins, H., & Yakovleva, N. (2006). Corporate social responsibility in the mining industry: Exploring trends in social and environmental disclosure. *Journal of Cleaner Production*, 14(3–4), 271–284. <https://doi.org/10.1016/j.jclepro.2004.10.004>.
- Jenkins, K. (2017). Women anti-mining activists' narratives of everyday resistance in the Andes: Staying put and carrying on in Peru and Ecuador. *Gender, Place and Culture*, 24(10). <https://doi.org/10.1080/0966369X.2017.1387102>.
- Johnson, V., Fitzpatrick, L., & Floyd, R. (2011). *What is the evidence that scarcity and shocks in freshwater resources can cause conflict instead of promoting collaboration*.
- JCAP (2016). *The "Canada Brand": Violence and Canadian Mining Companies in Latin America* (Vol. 2016). Justice and Corporate Accountability Project. 10.2139/ssrn.2886584.
- Jofré, I. C. (2019). ¿Por qué pena el mineral? Teorías mestizas fronterizas y ontologías de lo real con relación al extractivismo minero en San Juan, Argentina. *Antipoda. Revista de Antropología y Arqueología*, 37, 75–94.
- Kaup, B. Z. (2010). A Neoliberal Nationalization?: The Constraints on Natural-Gas-Led Development in Bolivia. *Latin American Perspectives*, 37(3), 123–138. <https://doi.org/10.1177/0094582X10366534>.
- Kirsch, S. (2014). M. capitalism: the relationship between corporations and their critics. U. of C. P. (2014). *Mining capitalism: the relationship between corporations and their critics*. University of California Press.
- Kirsch, S. (2001). Changing views of place and time along the Ok Tedi. *Mining and Indigenous Lifeworlds in Australia and Papua New Guinea*, 182–207.
- Kohl, B., & Farthing, L. (2012). Material constraints to popular imaginaries: The extractive economy and resource nationalism in Bolivia. *Political Geography*, 31(4), 225–235. <https://doi.org/10.1016/j.polgeo.2012.03.002>.
- Kronenberg, J. (2013). Linking ecological economics and political ecology to study mining, glaciers and global warming. *Environmental Policy and Governance*, 23(2), 75–90.
- Kunz, N. C., Kastle, T., & Moran, C. J. (2017). Social network analysis reveals that communication gaps may prevent effective water management in the mining sector. *Journal of Cleaner Production*, 148, 915–922.
- Le Billon, P., & Menton, M. (2021). Introduction. In *Environmental Defenders* (pp. 1–10). Routledge.
- Le Billon, P., Gamu, J., & Conde, M. (2016). *Volatile Commodities: A Review of Conflicts and Security Issues Related to Extractive Sectors*. SSHRC: Knowledge Synthesis Report.
- Le Billon, P. (2014). Natural resources and corruption in post-war transitions: Matters of trust. *Third World Quarterly*, 35(5), 770–786.
- Li, F. (2009). Documenting accountability: Environmental impact assessment in a Peruvian mining project. *PolAR. Political and Legal Anthropology Review*, 32(2), 218–236.
- Li, F. (2013). Relating divergent worlds: Mines, aquifers and sacred mountains in Peru. *Anthropologica*, 55(2), 399–411.
- Li, F. (2015). *Unearthing conflict: Corporate mining, activism, and expertise in Peru*. Duke University Press.
- Linton, J., & Budds, J. (2014). The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water. *Geoforum*, 57, 170–180. <https://doi.org/10.1016/j.geoforum.2013.10.008>.
- Lottermoser, B. (2010). *Mine Wastes. Characterization, Treatment and Environmental Impacts* (3rd ed.). Springer.
- Magliocca, N. R., Ellis, E. C., Allington, G. R. H., de Bremond, A., Dell'Angelo, J., Mertz, O., ... Verburg, P. H. (2018). Closing global knowledge gaps: Producing generalized knowledge from case studies of social-ecological systems. *Global Environmental Change*. <https://doi.org/10.1016/j.gloenvcha.2018.03.003>.
- Magliocca, N. R., Rudel, T. K., Verburg, P. H., McConnell, W. J., Mertz, O., Gerstner, K., ... Ellis, E. C. (2015). Synthesis in land change science: Methodological patterns, challenges, and guidelines. *Regional Environmental Change*, 15, 211–226. <https://doi.org/10.1007/s10113-014-0626-8>.
- Mahanty, S., & McDermott, C. L. (2013). Land Use Policy How does 'Free, Prior and Informed Consent' (FPIC) impact social equity? Lessons from mining and forestry and their implications for REDD+. *Land Use Policy*, 35, 406–416. <https://doi.org/10.1016/j.landusepol.2013.06.014>.
- Martinez-Alier, J., Anguelovski, I., Bond, P., Del Bene, D., Demaria, F., Gerber, J. F., ... Yáñez, I. (2014). Between activism and science: Grassroots concepts for sustainability coined by environmental justice organizations. *Journal of Political Ecology*, 21(1 A), 19–60. <https://doi.org/10.2458/v21i1.21124>.
- Martinez-Alier, J., & O'Connor, M. (1996). Ecological and economic distribution conflicts. In *Getting down to earth: practical applications of ecological economics*.
- Mehta, L. (2001). The manufacture of popular perceptions of scarcity: Dams and water-related narratives in Gujarat, India. *World Development*, 29(12), 2025–2041. [https://doi.org/10.1016/S0305-750X\(01\)00087-0](https://doi.org/10.1016/S0305-750X(01)00087-0).
- Mehta, L. (2007). Whose scarcity? Whose property? The case of water in western India. *Land Use Policy*, 24(4), 654–663. <https://doi.org/10.1016/j.landusepol.2006.05.009>.
- Menton, M., & Le Billon, P. (Eds.). (2021). *Environmental Defenders: Deadly Struggles for Life and Territory*. Routledge.
- Menton, M., & Gilbert, P. R. (2021). BINGOs and environmental defenders: NGO complicity in atmospheres of violence and the possibilities for decolonial solidarity with defenders. In *Environmental Defenders* (pp. 228–244). Routledge.
- Mwana, S. (2015). Mining and "community" struggles on the platinum belt: A case of Sefikile village in the North West Province, South Africa. *Extractive Industries and Society*, 2(3), 500–508. <https://doi.org/10.1016/j.exis.2015.05.003>.
- Mudd, G. M. (2007). Global trends in gold mining: Towards quantifying environmental and resource sustainability. *Resources Policy*. <https://doi.org/10.1016/j.resourpol.2007.05.002>.
- Munhenzva, P. M., Chimhete, N., & Kufakurinani, U. (2019). Conflict, livelihoods and survival among miners and farmers in gweru's greenvale, 2000–2016. *Global Environment*, 12(2), 338–353. <https://doi.org/10.3197/ge.2019.120206>.
- Muradian, R., Walter, M., & Martinez-Alier, J. (2012). Hegemonic transitions and global shifts in social metabolism: Implications for resource-rich countries. *Introduction to the special section. Global environmental change*, 22(3), 559–567.
- Muradian, R., Martinez-Alier, J., & Correa, H. (2003). International capital versus local population: The environmental conflict of the Tambogrande Mining Project, Peru. *Society and Natural Resources*, 10.1080/08941920309166.
- Murray Li, T. (2000). Articulating indigenous identity in Indonesia: Resource politics and the tribal slot. *Comparative Studies in Society and History*. <https://doi.org/10.1017/S0010417500002632>.
- Navas, G., Mingorría, S., & Aguilar-González, B. (2018). Violence in environmental conflicts: The need for a multidimensional approach. *Sustainability Science*, 13(3), 649–660. <https://doi.org/10.1007/s11625-018-0551-8>.
- Oana, I.-E., & Schneider, C. Q. (2018). SetMethods: An Add-on R Package for Advanced QCA. *The R Journal*, 10(1), 507–533. <https://journal.r-project.org/archive/2018/RJ-2018-031/index.html>.
- OCMAL. (2011). Cuando tiemblan los derechos: extractivismo y criminalización en América Latina.
- OECD (2017). *Due Diligence Guidance for Meaningful Stakeholder Engagement in the Extractive Sector*. OECD Publishing. <http://dx.doi.org/10.1787/9789264252462-en>.
- OECD (2011). *Guidelines for Multinational Enterprises*. OECD Publishing. <http://dx.doi.org/10.1787/9789264115415-en>.
- Özen, H., & Özen, S. (2017). What makes locals protesters? A discursive analysis of two cases in gold-mining industry in Turkey. *World Development*, 90, 256–268.
- Özkaynak, B., Rodríguez-Labajos, B., Aydın, C. I., Yanez, I., & Garibay, C. (2015). Towards environmental justice success in mining conflicts: An empirical investigation. *EJOLT Report No. 14*. Retrieved from http://www.ejolt.org/wordpress/wp-content/uploads/2015/04/EJOLT_14_Towards-EJ-success-mining-low.pdf%5Cnhttp://www.researchgate.net/publication/274713924_Towards_environmental_justice_success_in_mining_resistances_An_empirical_investigation.
- Özkaynak, B., Rodríguez-Labajos, B., Chicaiza, G., Conde, M., Kohrs, B., Raeva, D., ... Walter, M. (2012). Mining conflicts around the world. *Common grounds from an Environmental Justice perspective*. www.ejolt.org.
- Paredes Penafiel, A. P., & Li, F. (2019). Nourishing relations: Controversy over the Conga mining project in Northern Peru. *Ethnos*, 84(2), 301–322.
- Pareja, C., Honey-Rosés, J., Kunz, N. C., Fraser, J., & Xavier, A. (2018). What participation? Distinguishing water monitoring programs in mining regions based on community participation. *Water*, 10(10), 1325.
- Peluso, N. L., & Watts, M. (2001). *Violent Environments: Social Bonds and Racial Hubris*. Cornell University Press.

- Penman, M. (2016). Ambivalent company attitudes and how they shape conflict: Mining conflicts in Mexico's ejidos. *Extractive Industries and Society*. <https://doi.org/10.1016/j.exis.2016.04.001>.
- Perreault, T. (2013). Dispossession by accumulation? Mining, water and the nature of enclosure on the bolivian altiplano. *Antipode*, 45(5), 1050–1069. <https://doi.org/10.1111/anti.12005>.
- Pigrau, A., Borràs, S., Jariá-Manzano, J., & Cardesa-Salzmán, A. (2012). *Legal avenues for EJOs to claim environmental liability*.
- Ragin, C. C. (2008). *What is Qualitative Comparative Analysis (QCA)? Economic and Social Research Council's Research Methods Festival*. Saint Catherine's College: Oxford University.
- Robertson, D. (2006). Hard as the rock itself: Place and identity in the American Mining Town. In *Hard as the Rock Itself: Place and Identity in the American Mining Town*. 10.1111/j.1467-9272.2007.00648.x.
- Rodríguez-Labajos, B., & Martínez-Alier, J. (2015). Political ecology of water conflicts. *Wiley Interdisciplinary Reviews: Water*, 2(5), 537–558. <https://doi.org/10.1002/wat2.1092>.
- Roy, S. (2019). 'I live off this land': Tahltan women and activism in northern British Columbia. *Women's History Review*, 28(1), 42–56.
- Salem, J., Amonkar, Y., Maennling, N., Lall, U., Bonnafous, L., & Thakkar, K. (2018). An analysis of Peru: Is water driving mining conflicts? *Resources Policy*. <https://doi.org/10.1016/j.resourpol.2018.09.010>.
- Salinas, R. T., & Carmona, A. G. (2009). Conflictos por el agua en Chile: el gran capital contra las comunidades locales. Análisis comparativo de las cuencas de los ríos Huasco (desierto de Atacama) y Baker (patagonia austral). *Espacio abierto*, 18(4), 695–708.
- Scheidel, A., Temper, L., Demaria, F., & Martínez-Alier, J. (2018). Ecological distribution conflicts as forces for sustainability: An overview and conceptual framework. *Sustainability Science*, 13(3), 585–598. <https://doi.org/10.1007/s11625-017-0519-0>.
- Schlosberg, D. (2004). Reconceiving environmental justice: Global movements and political theories. *Environmental politics*, 13(3), 517–540.
- Schneider, C. Q. (2019). Two-step QCA revisited: The necessity of context conditions. *Quality & Quantity*, 53(3), 1109–1126.
- Schneider, C. Q., & Rohlfing, I. (2019). Set-theoretic Multimethod Research: The Role of Test Corridors and Conjunctions for Case Selection. *Swiss Political Science Review*, 25(3), 253–275.
- Schneider, C. Q., & Wagemann, C. (2012). *Set-theoretic methods for the social sciences: A guide to qualitative comparative analysis*. Cambridge University Press.
- Schneider, C. Q., & Wagemann, C. (2006). Reducing complexity in Qualitative Comparative Analysis (QCA): Remote and proximate factors and the consolidation of democracy. *European journal of political research*, 45(5), 751–786.
- Schoderer, M., Dell'Angelo, J., & Huitema, D. (2021b). *Water and mining*. In *Elgar Encyclopedia of Environmental Law*. Edward Elgar Publishing Limited.
- Schoderer, M., Karthe, D., Dombrowsky, I., & Dell'Angelo, J. (2021). Hydro-social dynamics of miningscapes: Obstacles to implementing water protection legislation in Mongolia. *Journal of Environmental Management*, 292 112767.
- Schoderer, M., Dell'Angelo, J., & Huitema, D. (2020). Water policy and mining: Mainstreaming in international guidelines and certification schemes. *Environmental Science and Policy*, 111, 42–54. <https://doi.org/10.1016/j.envsci.2020.04.011>.
- Schrecker, T., Birn, A. E., & Aguilera, M. (2018). How extractive industries affect health: Political economy underpinnings and pathways. *Health and Place*, 52, 135–147. <https://doi.org/10.1016/j.healthplace.2018.05.005>.
- Scott, J. C. (1985). *Weapons of the weak: Everyday forms of peasant resistance*. Yale University Press.
- Scott, R., & Bennett, E. (2014). Branding resources: Extractive communities, industrial brandscapes and themed environments. *Work, Employment and Society*, 29(2), 278–294. <https://doi.org/10.1177/0950017013519844>.
- Schilling-Vaccaro, A. (2017). 'If the company belongs to you, how can you be against it?' Limiting participation and taming dissent in neo-extractivist Bolivia. *The Journal of Peasant Studies*, 44(3), 658–676.
- Schilling-Vaccaro, A., & Flemmer, R. (2013). Why is prior consultation not yet an effective tool for conflict resolution?: the case of Peru. Working Paper No. 220. German Institute for Global and Area Studies (GIGA).
- Selby, J., & Hoffmann, C. (2014). Beyond scarcity: Rethinking water, climate change and conflict in the Sudans. *Global Environmental Change*, 29, 360–370. <https://doi.org/10.1016/j.gloenvcha.2014.01.008>.
- Sosa, M., & Zwartveen, M. (2016). Questioning the effectiveness of planned conflict resolution strategies in water disputes between rural communities and mining companies in Peru. *Water International*, 41(3), 483–500. <https://doi.org/10.1080/02508060.2016.1141463>.
- Swyngedouw, E., & Heynen, N. C. (2003). Urban political ecology, justice and the politics of scale. In *Antipode*. <https://doi.org/10.1111/j.1467-8330.2003.00364.x>.
- Temper, L., Del Bene, D., & Martínez-Alier, J. (2015). Mapping the frontiers and front lines of global environmental justice: The EJAtlas. *Journal of Political Ecology*, 22(1), 255–278.
- Theisen, O. M. (2008). Blood and Soil? Resource Scarcity and Internal Armed Conflict Revisited. *Journal of Peace Research*, 45(6), 801–818 <http://www.jstor.org/stable/27640770>.
- The Guardian, 05 July 2012. Peru anti-mining protests escalate during state of emergency. <<https://www.theguardian.com/world/2012/jul/05/peru-anti-mining-protests-escalate>>.
- Thomann, E., & Maggetti, M. (2020). Designing research with qualitative comparative analysis (QCA): Approaches, challenges, and tools. *Sociological Methods & Research*, 49(2), 356–386.
- United Nations Declaration on the Rights of Indigenous Peoples, United Nations General Assembly Resolution 61/295 (13 September 2007) UN Doc A/RES/61/295 (adopted by 143 votes to 4; 11 abstentions) (UNDRIP 2007).
- Urkidi, L. (2010). A glocal environmental movement against gold mining: Pascua-Lama in Chile. *Ecological Economics*, 70(2), 219–227. <https://doi.org/10.1016/j.ecolecon.2010.05.004>.
- Urkidi, L., & Walter, M. (2011). Dimensions of environmental justice in anti-gold mining movements in Latin America. *Geoforum*, 42(6), 683–695. <https://doi.org/10.1016/j.geoforum.2011.06.003>.
- Van Laerhoven, F., & Andersson, K. P. (2013). The virtue of conflict: An institutional approach to the study of conflict in community forest governance. *International Forestry Review*. <https://doi.org/10.1505/146554813805927219>.
- Velicu, I. (2012). The Aesthetic Post-Communist Subject and the Differend of Rosia Montana. *Studies in Social Justice*, 6(1), 125–141. 10.26522/ssj.v6i1.1072.
- Walter, M., & Martínez-Alier, J. (2010). How to be heard when nobody wants to listen: Community action against mining in Argentina. *Canadian Journal of Development Studies/Revue Canadienne d'études Du Développement*, 30(1–2), 281–301.
- Walter, M., & Urkidi, L. (2017). Community mining consultations in Latin America (2002–2012): The contested emergence of a hybrid institution for participation. *Geoforum*, 84, 265–279. <https://doi.org/10.1016/j.geoforum.2015.09.007>.
- Warnaars, X. S. (2012). Why be poor when we can be rich? Constructing responsible mining in El Pangui. *Ecuador. Resources Policy*, 37(2), 223–232. <https://doi.org/10.1016/j.resourpol.2011.10.001>.
- Welker, M. (2014). *Enacting the corporation*. University of California Press.