



Water policy and mining: Mainstreaming in international guidelines and certification schemes

Mirja Schoderer^{a,b,*}, Jampel Dell'Angelo^b, Dave Huitema^{c,b}

^a Deutsches Institut für Entwicklungspolitik (DIE), German Development Institute, Germany

^b Vrije Universiteit Amsterdam, Institute for Environmental Studies (IVM), the Netherlands

^c Open University of the Netherlands, the Netherlands



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ABSTRACT

This paper investigates how different dimensions of water – water as a public health concern, as an essential prerequisite for producing livelihoods, and as a cultural heritage or an element of spiritual practice – are taken up in international guidelines and certification schemes for the extractive sector. As a notoriously water-intensive economic activity, mining frequently infringes on other forms of water use. Simultaneously, the legal articulations and governance implications of the hydrological aspects of mining are complex, as commercial interactions associated with mining span the globe, governance efforts occur primarily at the national level and negative externalities manifest locally. Increasingly, transnational initiatives play a role in setting rules and norms for ‘responsible’ or ‘sustainable’ mining.

We assess to what extent these rules and norms take into account the hydrological implications of mining, looking at eight guideline documents and ten certification schemes for mineral extraction that originate from international organizations, corporate groups, or multi-stakeholder initiatives. We then illustrate the influence of transnational institutions in two cases, one in Mongolia and one in South Africa. Our results show that water as a public health concern receives the most attention while water as a cultural heritage is reflected the least. However, all institutions in our sample that were devised over the last two years refer to the different dimensions of water use comprehensively.

1. Introduction¹

Water is a ‘glocal’ resource (Gupta et al., 2013), tying global dynamics, such as international supply chains and markets, to local impacts and management practices. It is associated with multiple values and figures in a variety of discourses that conceive of water as, among other things, an economic good, an element of cultural heritage, or as a national security concern (Gupta and Pahl-Wostl, 2013). However, the extent to which water interests are given a place in different sectoral policies varies and is often limited. This challenge, which can be described as ‘mainstreaming’ and which is also referred to as policy coordination and integration (Weitz et al., 2017; Jordan and Lenschow, 2010), implies that by identifying and addressing inconsistencies between the goals and requirements of different sectors, trade-offs can be mitigated and synergies realized. It also touches upon coordination of public sector organizations that frequently conduct their work in isolation, thus preventing cross-sectoral integration (e.g. Tortajada, 2010).

In 2010, the United Nations General Assembly recognized the human right to clean drinking water and sanitation (UNGA, 2010). Several years before then, the Committee on Economic, Social and Cultural Rights framed the issue more broadly, adopting a General Comment on the Right to Water that recognized multiple usages beyond drinking and hygiene, such as those that secure livelihoods and actualize cultural practices (UNCESR, 2003). If unmitigated, the social and hydrological impacts of mining pose severe threats to these usages, as mining is notoriously water intensive and often leads to spills, dam breaks or other events that result in contaminated water resources and produce local conflicts (Conde and Walter, 2015; Perreault, 2014; Kemp et al., 2010).

The institutional framework covering mining operations and the governance implications of its hydrological dimension are complex, as minerals and metals form part of multinational supply chains. International law largely ignores the extractive sector in favor of affirming national sovereignty over natural resources. However, some

* Corresponding author at: Deutsches Institut für Entwicklungspolitik, Tulpenfeld 6, 53113 Bonn, Germany.

E-mail address: mirja.schoderer@gmail.com (M. Schoderer).

¹ The full references for all legislative and policy documents mentioned in this chapter can be found in Appendix A

international legislation still has implications for the sector, among them the World Heritage Convention (1972), the Convention on Environmental Impact Assessment in a Transboundary Context (1991), the Aarhus Convention (1998), or the Minamata Convention (2013). Public international law, however, imposes duties on countries, not on companies. It thus depends on host countries – the countries where mining operations occur – to ratify, implement, and enforce measures. In line with a wider trend towards non-state and public-private governance efforts, transnational organizations and initiatives increasingly play a role in setting rules and norms for the mining sector (Young, 2018; Pring et al., 1999).

We argue that the multinational nature of the mining sector and associated value chains coupled with the limitations of international and national legislation gives particular importance to transnational governance efforts. Such efforts are characterized by voluntary participation and the lack of a leadership role ascribed to the state (Djelic and Quack, 2010). This paper aims to better understand whether these institutions acknowledge the socio-hydrological impacts of mining, and, in doing so, potentially take a first step towards mitigating them. Institutions, here, are defined as norms, rules and strategies that govern the behavior of actors and their interactions with resources (Ostrom, 2005). We assess how well an illustrative sample of international guidelines and certification schemes for the mining sector incorporates various forms of water use – water as an element of public health, a prerequisite for economic livelihoods, and for cultural and spiritual practices. We first describe the ways in which mining operations affect water resources to set the scene upon which transnational governance efforts play out. We then present a heuristic to structure the relevant transnational institutions, before investigating to what extent they integrate the different dimensions of water. The subsequent section offers two illustrative cases to provide an example for the difficulties of mainstreaming water policy and mining at the level of the nation state, as well as for private sector-led efforts to that end. The final part of the paper critically discusses transnational governance schemes and lays out a research agenda to increase our systematic understanding of how water and mining are governed.

2. Mining and water resources – biophysical interlinkages and hydro-social implications

Mining is one of the most lucrative industries in the world (Els, 2017), but also one that is associated with some of the worst environmental and social impacts. Frequently, the extractive sector finds itself embroiled in conflicts (Schrecker et al., 2018; Conde, 2017) with a particular focus on the Global South since the 1990s (Bebbington, 2009). Still, governments in resource-rich countries often perceive mining as a stimulant for local economies and a boon for national coffers. However, the positive effects of mineral extraction on the social economy of host countries are highly disputed (e.g. Walter and Martinez-Alier, 2010). The traction of concepts such as the ‘resource curse’ and the ‘Dutch disease’ illustrate that countries often struggle to transform natural resource wealth into inclusive, long-term development (Dougherty, 2016; Ross, 2015; Mehlum et al., 2006). In fact, the wealth that is generated in mining operations tends to accumulate in the hands of few while the environmental costs and associated effects on health and livelihoods remain with local communities (Rodríguez-Labajos and Özkaynak, 2017). In that manner, mining operations also relate to struggles between the – geographic, social-political, ethnic, and economic – peripheries and the centers, where mining companies, national decision-makers and international financial organizations are located and where capital accumulates (ibid.).

In addition to larger scale mines, an estimated 15–20 % of all non-fuel minerals are extracted by artisanal, small-scale miners who operate with little to no mechanization (MMSD, 2002). Globally, 10–15 million people are employed in artisanal, small-scale mining (ASM) and the livelihoods of an additional 80–100 million people depend on the sector

(Kafwembe and Veasey, 2001). As they tend to take place in the informal sector, such mining practices are conducted outside of workplace safety and environmental regulations. Cyanide and mercury pollution, as well as damages to water sources and deforestation are among their most severe environmental impacts (Abe et al., 2019).

2.1. Mining and water pollution

Every year, mining operations mobilize 50×10^9 metric tons of geological material, resulting in vast waste deposits (Schwarzenbach et al., 2010). Commonly, these deposits contain suspended solids and dissolved contaminants like acid, salts, heavy metals, metalloids, and sulfate (Lottermoser, 2003). When these pollutants enter water streams, they cause severe damage to the aquatic environment and pose health risks for the surrounding communities. With proper management and handling, most severe contamination threats can be avoided. In practice, however, proper management and handling does not always take place. Aside from the intentional discharge of untreated wastewater, mining wastewater mostly enters watercourses through Acid Mine Drainage (AMD), or via spills or seepage of toxic chemical compounds (ibid.; Dougherty, 2016). Heavy metals that filter into the soil can also be taken up by vegetation and livestock and enter the food chain through bioaccumulation (Kasimov et al., 2017). This has serious ramifications for the health of surrounding communities but is hardly limited to them when, for example, produce or meat are regularly sold outside of the community (Malm, 1998).

Generally, metallic ores need additional treatment after excavation in order to separate the valuable metals from the waste rock. In a process called leaching, toxic chemicals are applied to the rock, with industrial gold production mostly relying on cyanide and ASM miners dissolving traces of gold in mercury. It takes around 700 tons of water and 140 kg of cyanide to produce 1 kg of gold (Mudd, 2007). The slurry from leaching processes usually contains the leaching chemicals, waste rock and, frequently, sulfuric acid and heavy metals. It is stored behind a dam or in open-air, dry heaps. Some mines treat tailings on-site and then release them into the environment, others store them until mining closure approaches. Tailings storage can be problematic, when dams are subject to seepage or fail entirely, which is not an exception. In fact, Davies and Martin (2000) show that 50 % of all tailings dams worldwide are constructed in a manner known to be highly susceptible to erosion and failure. Since the 1980s, an estimated 2000 tons of mercury have been released into the Amazon river system from mining operations (Malm, 1998), while another review claims that small-scale mining alone releases 460 tons of mercury each year (Porcella et al., 1997).

2.2. Mining and water conflicts

This multitude of environmental problems is usually at the root of mining-related conflicts and tends to contrast with the multiple values that local communities assign to water (Martinez-Alier et al., 2010). Mining operations in developing countries are frequently located in remote areas where communities rely on untreated water from streams or boreholes for drinking and hygiene, and on fish from nearby streams for protein. In particular for indigenous communities, specific modes of fishing are tied to forms of cultural heritage and streams can carry spiritual significance as meaningful, conscious entities (Boelens, 2014). Mining-related water pollution thus affects the health, livelihoods, and cultural heritage and spiritual practices of rural communities. These high and varied stakes are behind the large number of resistance movements that mining operations have sparked, often led by indigenous peoples. For these groups, natural resources degradation can threaten their way of life and continued existence. For that reason, indigenous peoples have to give free, prior, and informed consent (FPIC) before any kind of natural resource development is conducted on their territories, as specified by ILO Convention 169 and article 28 of

the UN Declaration on the Rights of Indigenous Peoples (ILO, 1989; UNDRIPS, 2007).

The Global Atlas of Environmental Justice (EJAtlas) provides information on environmental conflicts in a collaborative database that is coordinated by researchers at the Universitat Autònoma de Barcelona (Temper et al., 2015). An analysis of this database shows how central water is to mining conflicts: 85 % out of all registered conflicts surrounding mineral extraction are related to water degradation (ibid.). Water can play a dual role as either the commodity in dispute or an element impacted by the commodification process (Rodríguez-Labajos and Martínez-Alier, 2015): in dry areas, it is the freshwater demand of mining operations compared to the water needs of other users that places the extraction of water at the center of the conflict (e.g. Jackson, 2018). In wetter areas, conflicts tend to center around the pollution of water resources from mining wastes, with water being the affected element (e.g. Adler et al., 2007).

Conflicts from mineral extraction run across all geographical scales (e.g. Paredes, 2016). Contestation usually takes place at the local level but it often involves national actors, as taxes and royalties from mineral extraction generate revenue for national governments. In consequence, national actors “frequently share the economic interests of mining firms who want access to national mineral resources” (Bridge, 2004, p.237) and thus privilege companies’ demands over those of other water users (Budds and Hinojosa, 2012; Sosa and Zwarteveen, 2016). At the same time, the increasing demand for goods that are produced in an environmentally and socially conscious manner introduces consumers as potential players on the international stage (Mohr et al., 2001; Du et al., 2007). Frequently, international NGOs also get involved in mining-related water conflicts, usually siding with affected local communities.

3. International guidelines and certification schemes for the extractive sector

The governance landscape for the extractive sector is vast. Here, we distinguish a) non-legally binding guidance documents that do not register adherence to their frameworks, from b) certification schemes and standards,² which use economic incentives and communicative instruments to attract members and which monitor adherence to rules and procedures. Economic incentives, in this case, are understood as an umbrella term that comprises membership in the norm-setting organization as a form of increasing ‘reputational capital’ (Angel and Rock, 2005) and direct capital investments, such as when banks conduct the rule-setting. Communicative instruments refer primarily to labels that unfold their effects on the free market. Our distinction between certification schemes and guidance documents follows Cashore’s separation of non-stake, market-driven governance from shared or public-private governance, in that guidance documents place final, ultimate authority with the government, while certification schemes assign ultimate authority to external audiences (Cashore, 2002).

To structure the overview of transnational institutions for the extractive sector, we use a heuristic that distinguishes four categories that apply to all institutional arrangements, and four additional categories that only apply to private sector standards. The general categories indicate 1) whether the institution targets public or private actors; 2) whether it refers to ASM or larger-scale enterprises; 3) whether multiple stakeholders were involved in the design process; and 4) which minerals or metals it covers. For certification schemes that are based on assured compliance, we also assess how strict the monitoring process is by asking 5) whether audits are conducted by a third-party; 6) whether they include on-site visits; and 6) whether auditing occurs annually. In addition, we check 7) how well these schemes adhere to the international human rights framework to provide an indication of the degree of ambition inherent in the standard. Table 1 gives an overview of all

Table 1
Guidance documents by international organizations.

Name of guideline (year) – issuing organization					
Addresses the public sector	Addresses the private sector	Refers to large- and medium-scale mining	Refers to ASM	Multiple stakeholders consulted in design	Applies exclusively to gold or precious metals
Due Diligence Guidance for Meaningful Stakeholder Engagement in the Extractive Sector (2017) - OECD					
–	✓	✓	–	✓	–
Due diligence guidance for responsible supply chains of minerals from conflict-affected and high-risk areas (2016, inception 2010) – OECD					
–	✓	✓	–	–	–
Guidelines for multinational enterprises (2011, inception 1976) – OECD					
–	✓	✓	–	–	–
Toolkit and Guidance for Preventing and Managing Land and Natural Resources Conflict. Extractive Industries and Conflict (2012) – EU-UN Partnership					
–	✓	✓	–	–	–
Framework on Business and Human Rights ‘Protect, Respect and Remedy’ and Guidelines for Implementation (respectively 2008, 2011) – UNOCHRC					
✓	✓	–	–	✓	–
Berlin II Guidelines for Mining and Sustainable Development (2002) – UN					
✓	✓	✓	–	–	–
Environmental Guidelines for Mining Operations (1998) – UNDESA, UNEP					
✓	✓	✓	–	✓	–
Mining Policy Framework Assessment (2013) – Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF)					
✓	–	✓	✓	–	–

guidance documents that we assessed and Table 2 shows certification schemes and standards.³

To identify the most relevant guidelines and standards, we consulted academic literature on the subject, conducted an analytical online search using the keywords “guideline”, “principle”, “certification” or “standard” in combination with either “mining”, “gold”, “mineral extraction”, “metal extraction”, “extractive industries” or “extractive sector”. We then skimmed all documents for references to additional standards or guidelines. For the purpose of this analysis, we limited our selection to institutions that either cover all mineral and metal extraction or focus on gold, exclusively, as its extraction is associated with some of the worst impacts on water resources and has caused serious conflicts in the past (Cartwright, 2016; Eisler and Wiemeyer, 2004). Other selection criteria were the focus on extraction as the relevant step in the supply chain and as a comprehensive process, in that institutions go beyond the mere setting of technical parameters for machinery or chemicals. Applying these criteria led to the identification of eight guidance documents and ten certification schemes.

To varying degrees, all private sector schemes recognize the United Nations’ human rights framework and the OECD’s guidance documents. In terms of private-sector uptake, the most important guideline is the *Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas* (OECD, 2016). The document focusses on tin, tantalum, tungsten, and gold (3TG), whose illegal extraction was associated with the financing of violent, armed conflicts in sub-Saharan Africa (Young, 2018). In response to that, a variety of certification schemes emerged from 2008 onwards which were concerned with ‘responsible’ or ‘conflict-free’ sourcing and supply chain management. These schemes include the *Chain of Custody Certification* by the Responsible Jewellery Council (RJC, 2017), and the *Conflict-Free Gold Standard* by the World Gold Council (WGC, 2012).

Some guidance documents explicitly address the interactions of mining operations with surrounding communities, such as the *Due Diligence Guidance for Meaningful Stakeholder Engagement in the Extractive Sector* (OECD, 2017), or the *Toolkit and Guidance for*

² Certification schemes and standards are used here interchangeably.

³ For improved presentation, the tables have been abridged. For the full versions, please consult Appendices B and C.

Table 2
Overview of certification schemes and standards for the extractive sector.

Name (year) – issuing organization										
Addresses the public sector	Addresses the private sector	Refers to large- and medium-scale mining	Refers to ASM	Multiple stakeholders consulted in design	Applies exclusively to gold or precious metals	Third-party audit	On-site visits	Annual audit	Adheres to UN Human Rights Framework	Adheres to OECD guidelines
Initiative for Responsible Mining Assurance (2018) Certification – IRMA Secretariat	✓	✓	–	✓	–	✓	✓	–	✓	✓
Principles (2015, inception 2003) and Position Statement on water (2017) – International Council on Minerals and Metals (ICMM)	✓	✓	–	–	–	✓	–	✓	✓	✓
Fairmined Standard Certification (2014, inception 2012) – Alliance for Responsible Mining (ARM), Fairtrade	✓	–	✓	✓	✓	✓	✓	✓	✓	✓
Conflict-free Gold Standard (2012, inception 2011) – World Gold Council (WGC)	✓	✓	✓	✓	✓	–	–	–	✓	✓
Chain of Custody Certification (2012, inception 2005) – Responsible Jewellery Council (RJC)	✓	✓	✓	✓	✓	–	–	–	✓	✓
Extractive Industries Transparency Initiative (EITI) (2016, inception 2009) – UK government	✓	✓	✓	✓	✓	✓	–	–	✓	✓
Environmental, Health and Safety Guidelines (2007) – IFC / World Bank	✓	✓	–	–	–	✓	–	✓	–	–
Environmental, Health and Safety Guidelines for Mining (2007) – IFC / World Bank	✓	✓	–	–	–	–	✓	–	–	–
Environmental and Social Performance standard (2012, inception 2006) – IFC	✓	✓	–	–	–	–	✓	✓	✓	✓
Environmental and Social Standard (2017) – World Bank	✓	✓	–	–	–	–	✓	✓	✓	✓

Preventing and Managing Land and Natural Resources Conflict. Extractive Sector and Conflict (EU-UN, 2012). Others provide policy recommendations for countries, such as the two sets of guidelines regarding mining and sustainable development that the UN published following up on the United Nations Conference on Environment and Development in Rio de Janeiro (UN, 2002; UNDESA and UNEP, 1998), or the *Mining Policy Framework Assessment* (IGF, 2013). The *OECD Guidelines for Multinational Enterprises* address multinational companies in general and the *UN Framework for Businesses and Human Rights* targets both companies and states (OECD, 2011; UNOHCHR, 2011; UNHCR, 2008).

Recent private sector initiatives include the *Initiative for Responsible Mining Assurance* whose certification is still in the pilot phase and the *Fairmined Standard*, which focusses exclusively on ASM operations (IRMA, 2018; Fairmined, 2014). As the only scheme so far, Fairmined also includes a specific certification for miners that operate completely without using toxic chemicals. The International Council on Mining and Metals (ICMM) was created to develop an agenda for the role of mining in sustainable development following the Earth Summit in Rio and has since issued a set of principles and issue-specific position statements, among them one on water stewardship (MMSD, 2002; ICMM, 2017; ICMM, 2015). The International Finance Corporation (IFC) and the World Bank have both developed *Standards on Environmental and Social Sustainability* (IFC, 2012; World Bank, 2017), as well as general and sector-specific *Environmental, Health and Safety Guidelines* that lay out technological and behavioral norms for World Bank and IFC projects (IFC and World Bank, 2007a; IFC and World Bank, 2007b). In contrast to other private-sector schemes, the *Extractive Industries Transparency Initiative (EITI) Standard* targets countries instead of companies, focusing on revenue transparency and standards of ‘good governance’ (EITI, 2016).

4. The role of water in guidelines and certification schemes

In light of how many transnational institutions for the extractive sector refer to international human rights, it is important to first clarify what this implies for water issues before we assess the institutions in detail. The UN human rights framework consists of the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social, and Cultural Rights (1966). Jointly, they form the International Bill of Human Rights. Contrary to food and housing, which are mentioned as examples pertaining to an adequate

standard of living, the right to water is not part of the Covenant on Economic, Social and Cultural Rights (ibid.). In its General Comment on the Right to Water, the Committee on Economic, Social, and Cultural Rights states that water is a prerequisite to a life in dignity and already implied in the article on adequate housing and food (UNCESCR, 2003). However, its exclusion from the Covenant means that companies that adhere to the Bill of Human Rights do not necessarily recognize the human right to water. Since its wording only extends to drinking and sanitation, companies that observe the human right to water do not necessarily commit to eliminating adverse impacts on all kinds of water uses. Similar limitations apply to companies who adhere to the ‘do no harm’ principle that the UN lays out in its Guiding Principles on Business and Human Rights. As the phrasing obliges companies to “not cause harm to individuals’ human rights” (UNOHCHR, 2012, p.13), negative impacts on water uses that are not explicitly recognized under the human rights framework are not necessarily covered.

The right of indigenous peoples to protect the environment and the productive capacity of resources is guaranteed by the Declaration on the Rights of Indigenous Peoples (UNDRIPS, 2007). So is the right to continue and strengthen cultural and spiritual practices that are tied to specific territories and waters (ibid.). Beyond the human rights framework, *Table 3* indicates to what extent transnational institutions for the extractive sector take account of the different dimensions of water use that we laid out in the beginning of the chapter. In the table, one filled circle indicates that the institution identifies adverse effects of mining on public health, livelihoods, or cultural practices but does not explicitly tie them to water. Two filled circles mark institutions that mention negative impacts on a particular form of water use but limit it in scope to either ground- or surface water or to a particular population group. Three filled circles indicate full acknowledgement while three empty circles identify institutions that do not refer to any negative effects from mining on this dimension of natural resources use.⁴

Water as a public health concern receives the most attention, with two thirds of all documents referencing it. Interestingly, when public health is mentioned as a good potentially affected by mining, water is explicitly referred to in all but one instance, as *Table 3* indicates.

⁴ For presentation purposes, this table has been abridged. The full version, including page references, is available online: < https://drive.google.com/open?id=1kRLE1T0S0JLI_OEOZmjPPuali9YO9qis >

Table 3
Integration of water in guidelines and standards for extractive industries.

Name (year of last update) – year of inception if different from last update	Addresses water as public health concern (drinking and hygiene)	Addresses water as an economic good (livelihoods)	Addresses water in its cultural & spiritual dimension (traditional & religious practices)
Due Diligence Guidance for Meaningful Stakeholder Engagement in the Extractive Sector (OECD 2017)	●●○	●●●	●○○
Due diligence guidance for responsible supply chains of minerals from conflict-affected and high-risk areas (OECD 2016) – 2010	○○○	○○○	○○○
Guidelines for multinational enterprises (OECD 2011) – 1976	●○○	○○○	○○○
Toolkit and Guidance for Preventing and Managing Land and Natural Resources Conflict. Conflict Prevention in Resource-rich Economies (EU-UN 2012)	●●●	●●●	●●○
Framework on Business and Human Rights 'Protect, Respect and Remedy' and Guidelines for Implementation (UNOHCHR 2011, UNHRC 2008)	○○○	○○○	○○○
Berlin II Guidelines for Mining and Sustainable Development (UN 2002)	●●●	○○○	○○○
Environmental Guidelines for Mining Operations (UNDESA and UNEP 1998)	●●●	○○○	○○○
Initiative for Responsible Mining Assurance (IRMA 2018)	●●●	●●○	●●●
International Council on Minerals and Metals Principles and Position Statement on water stewardship (ICMM 2017)	●●●	●●●	●●●
Fairmined Standard (Fairmined 2014) – 2012	●●○	○○○	●○○
Conflict-free Gold Standard (WGC 2012) – 2011	○○○	○○○	○○○
Chain of Custody Certification (RJC 2012) – 2005	○○○	○○○	○○○
Mining Policy Framework Assessment (IGF 2013)	○○○	●●○	●○○
Extractive Industries Transparency Initiative Standard (EITI 2016) – 2009	○○○	○○○	○○○
Environmental, Health and Safety Guidelines for Mining (IFC and World Bank 2007a)	●●●	●●●	●○○
Environmental, Health and Safety General Guidelines (IFC and World Bank 2007b)	●●●	●●●	○○○
Environmental and Social Performance standard (IFC 2012) – 2006	●●●	●●●	●●○
Environmental and Social Standard (World Bank 2017)	●●●	●○○	●●●

Negative impacts of mining on water resources under the frame of affected livelihoods figure in half of all cases. Here as well, all but one document make an explicit link to water resources when acknowledging the adverse impacts of mining on other livelihoods. The cultural and spiritual dimension of water use is acknowledged the least, with only five mentions. Out of these five, two documents only refer to cultural uses of a specific population group or relegate the mention to a case study box instead of the main text. Out of all three dimensions, the link between mining and water resources is drawn the least clearly here, as four out of 18 documents cite possible damages to cultural or spiritual practices without linking them to water.

Water as an element of public health is mainly concerned with clean drinking water, reflecting the framing of the human right to water. Its prevalence in transnational institutions illustrates the traction of this particular discourse. The topic of cultural and spiritual practices is reflected the least. However, our sample indicates that this discourse is slowly gaining traction, with all institutions conceived after 2012 referencing cultural heritage or the sacred nature of the environment. In fact, all institutions that came into being over the last two years – three out of the eighteen we assessed – reference public health, livelihoods and cultural and spiritual practices as goods that are possibly affected by mining.

Out of the purely advisory documents, the *Guidance for Meaningful Stakeholder Engagement* goes furthest in acknowledging the multiple water needs of other users. It ties the loss of water quality and quantity to infringements on the human right to an adequate standard of living and the right to health (OECD, 2017, p.46). While not explicitly mentioning water, the document also points out the spiritual significance of natural resources and cautions against actions that affect other users' right to participate in cultural life (ibid.). Among the certification schemes, the IRMA standard is perhaps the most stringent in its integration of water issues, along with the position statement on water issued by the International Council on Metals and Minerals, and the Environmental and Social Performance Standards developed by the IFC and the World Bank. The IRMA standard dedicates an entire chapter to water management, naming the prevention of ground- and surface water contamination as one of its primary goals (IRMA, 2018, p.131). It obliges companies to identify water users and potentially affected communities and to assess potential impacts jointly with them, so that mitigation strategies reflect stakeholder needs (ibid., p.133). In a similar vein, the position statement by the ICMM recognizes water as a "shared resource with high social, cultural, environmental and economic value" (ICMM, 2017, p.4) and obliges its members to actively engage with stakeholders to reduce potential socio-environmental impacts. This is also true for the IFC and the World Bank standards (IFC, 2012, World Bank, 2017).

5. Water policy and mining in Mongolia and South Africa

Mining is a key pillar of the Mongolian economy, making up 20 % of the national GDP in 2013 (Ganbold and Ali, 2017). Compared to that, its contribution to the South African GDP is relatively low with 7% in 2015. However, South Africa is still the largest exporter of platinum and the fifth largest exporter of gold worldwide (Askham and Van der Poll, 2017). In both countries, mining is associated with water degradation and corruption, and has faced significant public contestation (ibid., Schneider, 2016; Byambajav, 2015; Chene, 2012). Mongolia is compliant with the EITI Standard and has had its mining policy framework assessed against the recommendations by the Intergovernmental Forum on Mining, while South Africa has not and doesn't participate in the EITI process.

5.1. Overview of the legislative frameworks

Mongolia's regulatory framework for mining consists primarily of the Minerals Law and the Environmental Impact Assessment Law. According to the Minerals Law, the holder of a mining license is allowed to use land and water in compliance with applicable laws (Art. 27.1.10), and in line with a water use agreement that the company has to sign with the respective river basin authority (Art. 35.3.7). The Minerals Law also obliges companies to

propose an environmental protection plan that includes provisions on the protection, utilization and conservation of water (Art. 39.1.4.2) and to submit annual reports on its implementation which are assessed and validated by an inspection team (Art. 39.1.7). The Environmental Impact Assessment Law reiterates the demand for a management plan but does not explicitly mention water (Art. 9.5). It also includes a provision that mandates stakeholder consultation as part of the environmental impact assessment (EIA) (Art. 17.4). Mongolia's water legislation where it pertains to mining (i.e. the Water Law and the Water Pollution Fee Law) primarily regulates the levying of fees and fines for water use and pollution. A notable exception is the so-called 'Law with the Long Name' that prohibits mining in riverbeds and on riverbanks (Art. 4.1). The Water Law defines wastewater standards as the maximum permissible levels of pollutants according to the source of pollution (Art. 3.1.25) but it holds no specific provisions for water quality standards.

When compared to international guidelines for mining that target the public sector, Mongolia's legislative framework mirrors most recommendations expressed in the UN's Environmental Guidelines for Mining (1998) and the Berlin II Guidelines (2002). Both endorse environmental management systems that comprise EIAs, environmental management plans, as well as a transparent and comprehensive monitoring, reporting and auditing procedure. They also recommend stakeholder participation and the setting of water quality standards. These last requirements can be considered weak points in the Mongolian legislative system as stakeholder engagement rarely occurs in practice and public authorities do not have the capacity to comprehensively monitor water quality, as the Intergovernmental Forum on Mining points out (IGF, 2017). Contrary to the guidelines, Mongolian law holds no provisions for an assessment of the social-economic impact of the planned project and, in contrast to the recommendations of the UN Business and Human Rights framework, it does not demand a human rights risk assessment either. Additionally, enforcing environmental legislation is challenging since lower-level public administrations experience a lack of human and financial resources (Dombrowsky et al., 2018) and the country struggles with corruption.

In South Africa, mining is regulated by the Mineral and Petroleum Resources Development Act (MPRDA). The MPRDA enables the holder of a mining right to use surface and groundwater resources on the site in accordance with the National Water Act (Art. 5.3.d and 27.7.b). One of the stipulations that might prevent the granting of a mining right, however, are "unacceptable pollution, ecological degradation or damage to the environment" (Art. 17.1.c, 23.1.d). As part of the application for a mining right, an EIA has to be submitted that includes an environmental management plan. A community consultation is then organized by the entity in charge of assessing the application. The Water Act includes a chapter on pollution prevention that puts Catchment Management Agencies in charge of ensuring that water users comply with the legislation and to direct their efforts in taking proper measures if need be (Art. 19.1.–8.). One of the considerations in granting a water use license is to be the "the likely effect [...] on the water resource and on other water users" (Art. 27.1.f). In addition, the responsible authority can set conditions for granting a license that relate to water protection, other existing and potential water users, or that specify required management practices (Art. 29.1.a–b).

The South African framework includes many of the provisions recommended by international guidelines. It does not, however, include any details on the monitoring, reporting or auditing responsibilities of mining right holders, nor any specific human rights related provisions. In addition, the capacity and expertise of the Department of Mineral Resources to adequately assess EIAs has been questioned (Caripis, 2017) and Catchment Management Agencies have not yet been established in all catchment areas (Meissner et al., 2017). Corruption further complicates effective natural resources governance (Caripis, 2017).

5.2. Mining operations and transnational norm-setting

In 2009, the Mongolian government signed an investment agreement

with Ivanhoe Mines and Rio Tinto to develop the Oyu Tolgoi copper-gold deposit in the Gobi desert. Oyu Tolgoi is the largest financial undertaking in Mongolian history and one of the largest undeveloped copper-gold mines in the world (Jackson, 2018). In 2015, the IFC decided to support the project, which automatically subjects Oyu Tolgoi to its social and environmental performance standards. Rio Tinto and Ivanhoe Mines are members of the ICMM and Rio Tinto further subscribes to the UN Guiding Principles on Business and Human Rights, as well as to the OECD Guidelines for Multinational Enterprises. Situated in an area where water resources are extremely scarce, the Oyu Tolgoi project faced public opposition because of fears over falling water tables and drying wells that endanger the livelihoods of local communities who rely on animal husbandry (Fraser and Kunz, 2018). In consequence, the company initiated a dialogue on water in 2013, in the process of which community interviews, staff trainings, and meetings with other Mongolian mining companies took place that culminated in the development of a Voluntary Code of Practice (VCP) on water management.

The VCP echoes the requirements of the IFC's Performance Standards, which, at their core, resemble the ICMM position statement on water stewardship but exceed it in terms of operational detail. The IFC Standards demand environmental and social assessments and an environmental management plan, stakeholder engagement and the installation of a grievance mechanism, a (participatory) monitoring and reporting system, and livelihood restoration measures to make up for economic losses that stakeholders incur. In water stressed areas, the Standards further require that measures be taken to reduce water usage (IFC, 2012). In the VCP, signatories commit to optimize water efficiency, to report on water related risks and measures taken to mitigate them, to install participatory water monitoring programs as well as a community grievance mechanism and to support communities in maintaining access to water (VCP, 2016).

Oyu Tolgoi has complied with these provisions, providing access to the grievance mechanism on its website, as well as digital copies of its EIAs and auditing reports. It has also installed a Herders' Livelihood Support program, which provides training opportunities and support for local programs on animal health and pastureland management. In that sense, Oyu Tolgoi can be considered an exemplary case where transnational rule-setting has contributed to better water management in the mining sector that, to some extent, compensates for weaknesses in the national legislation and enforcement. However, critical voices claim that the transfer of water management responsibilities away from the state and to private entities has caused frustration among local water users who contest the legality of planned infrastructure measures that affect their water resources and who question Oyu Tolgoi's ostensibly good environmental performance record (Jackson, 2018). They also challenge the design of community engagement procedures, pointing out that they occur on unequal footing and echoing complaints that Oyu Tolgoi enjoys privileged access to decision-makers against which herders and non-governmental groups remain powerless (ibid., Lander, 2019). In that sense, this example also illustrates the limits of transnational institutions, which cannot replace functional political decision-making processes where diverging interests – such as the use of scarce water resources for mining versus for animal husbandry – are negotiated.

In South Africa, we focus on the Lower Olifants basin in KwaZulu-Natal province. Here, two major mining operations are located: the Palabora copper mine, with Rio Tinto as the majority shareholder until 2013 and since then majorly owned by the HBIS Group, and the phosphate mine Foskor, which is fully state-owned. While Rio Tinto is a member of the ICMM and commits to its water stewardship principles, as well as to the OECD Guidelines for Multinational Enterprises and the UN Business and Human Rights framework, the HBIS Group makes no such commitments (HBIS Group, 2020). Both mines receive water from the Phalaborwa barrage, along with a nearby municipality and Kruger National Park further downstream. The water board in charge of managing the barrage and South African National Parks (SANParks) struggle with declining water quality and quantity and SANParks is concerned that ecological reserve requirements for Kruger Park are not met (King et al., 2008). Palabora and Foskor

claim to have little to no influence on water quality, reusing most of their water and storing liquid tailings behind dams. However, there is little public trust and communities often hold the mines responsible for degraded water quality in the absence of transparent water quality monitoring (interviews and private correspondence).

While the Palabora mine claims to conduct continuous monitoring of its environmental impact, no impact assessments, management reports or audits are available, contradicting the recommendations of the ICMM principles, the Guidance for Multinational Enterprises and the Business and Human Rights framework. There is no information on whether Palabora engages with other user groups of the Phalaborwa barrage, although the company has established a Community Development Forum with representatives of five communities in the municipality. According to its website, the company plans to conduct a social impact and a strategic environmental assessment and to establish a grievance mechanism but no information on the details of these procedures is available (Palabora Copper (Pty) Limited, 2012). Foskor, which is fully state-owned and subscribes to no transnational institutions, publishes its annual water consumption figures, reports on which stakeholder concerns it has identified and how the company engages with these. Mostly, engagement centers on the participation of its environmental management team in fora, such as the quarterly Environmental Forum that consists of local industry representatives, governmental bodies and special interest groups, the Olifants Water Catchment Forum, and the Kruger National Park Environmental Management Forum (Foskor, 2016). In the Lower Olifants basin, we thus find little evidence for the positive impact of transnational institutions.

6. Discussion and conclusion

The environmental and social effects of voluntary governance arrangements on the ground remain highly contested as our case examples illustrate. Some scholars consider transnational governance efforts as an opportunity to harness market forces to foster sustainable practices in a context where governments are unable or unwilling to provide regulation (Gulbrandsen, 2010). Others are concerned that these schemes might exacerbate poverty, overlook the underlying causes of environmental degradation, and impose foreign-authored systems that are blind to local contexts (Quilliam et al., 2011; Neilson, 2008). In framing their recommendations under the technical-administrative notion of good governance, these schemes are seen to "depoliticize[s] issues of political economy in resource extraction" (Bourgouin and Haarstad, 2013, p.92). For their critics, transnational organizations and institutions in their reliance on market pressures form part of the "neo-liberal turn in environmental governance" (Mehta et al., 2012, p.198), in the context of which rights, resources and responsibilities for water management are transferred away from states and local communities to mining corporations (Jackson, 2018; Budds and Hinojosa, 2012; Sosa and Zwarteveen, 2016). Discursively, critics diagnose a link between this trend and the reconceptualization of water as a commodity as opposed to a public good, and a narrowing of the multiple values that it represents into one singular, "decontextualized, universalized and naturalized" notion of water (Jackson, 2018, p.337).

On the one hand, our results indicate an increasing trend among transnational organizations to acknowledge multiple values and usages of water. On the other hand, some of these organizations frame their acknowledgement in terms of not only mitigation but compensation (e.g. IFC, 2012; World Bank, 2017). This presupposes the commensurability of values (Gómez-Baggethun and Ruiz-Pérez, 2011; Martínez-Alier et al., 2010), conceiving of monetary payments as an adequate form of redress for damages to, e.g., cultural heritage, and thus supporting the notion of multiple meanings being conflated into one. Regardless of these differences, our results illustrate the close links between global discourses and institutional development, as the dominance of the 'safe drinking water' discourse shows and the growing traction of the discourse framing water as a culturally significant resource.

Several scholars challenge the notion of transnational governance as

a one-directional shift of responsibility away from states and onto companies (e.g. Green, 2014; Marx et al., 2012). Pattberg et al. (2018), for example, show that private actors influence public sector efforts related to global climate governance by creating knowledge, affecting behavioral change, or setting norms that then influence state-led processes. The same applies to public organizations that originate from governance levels other than the national one. In that manner, transnational governance efforts and state-led policy developments are tightly intertwined, with transnational certification schemes and guidance documents constituting an integral part of the institutional framework that governs mining and water.

Extrapolating to the future, it stands to reason that the transnational institutional framework for the mining sector continues to grow and, in keeping with recent trends, moves towards a fuller recognition of multiple forms of water use. Recognizing the intertwined nature of global policy discourses, transnational institutions, and state-led legislative processes, a continued emphasis on the multiple values linked to water and their non-commensurability might support institutional designs that recognize and respect this diversity, both regarding transnational institutions and national legislative frameworks.

As with all institutions, the effectiveness of transnational governance schemes depends on a variety of design factors but also on their implementation on the ground (e.g. Kalfagianni and Pattberg, 2013). To understand the management decisions that determine water-related impacts from mining, two strands of research are promising. Firstly, a more in-depth analysis of the design features and the uptake of the transnational institutional frameworks we assessed here would provide further insights into their potential to mitigate adverse impacts on water resources. Alternatively, more empirical, context-specific work is needed to understand how transnational institutions and national policies for the extractive sector interact, how they come to be, and how they play out in practice. Apart from biophysical characteristics of the case study area, context-specific analyses need to take into account the power dynamics that influence how and by whom resources are used in

practice, as well as discourses that render specific modes of behavior comprehensible and negate others (Clement, 2010; Brisbois et al., 2019).

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CRediT authorship contribution statement

Mirja Schoderer: Conceptualization, Formal analysis, Investigation, Methodology, Visualization, Writing - original draft. **Jampel Dell'Angelo:** Conceptualization, Supervision, Methodology, Writing - review & editing. **Dave Huitema:** Conceptualization, Supervision, Writing - review & editing.

Declaration of Competing Interest

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

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Appendix B

See Table B1

Table B1

Overview of guidance documents by international organizations.

Name	Year of inception	Addressee	Issuing organization	Consulted actors	Minerals and metals covered
Due Diligence Guidance for Meaningful Stakeholder Engagement in the Extractive Sector (2017)	2017	Private sector Larger-scale mining	OECD	Multiple stakeholders compiled into advisory group chaired by government representatives, including civil society groups and industry	Not specified
Due diligence guidance for responsible supply chains of minerals from conflict-affected and high-risk areas (2016)	2010	Private sector Larger-scale mining	OECD	Multiple stakeholders, including industry, civil society and country representatives	Not specified
Guidelines for multinational enterprises (2011)	1976	Private sector Larger-scale mining	OECD	None mentioned	Not specified
Toolkit and Guidance for Preventing and Managing Land and Natural Resources Conflict. Extractive Industries and Conflict (2012)	2012	Private sector Larger-scale mining	EU-UN Partnership	None mentioned	Not specified
Framework on Business and Human Rights 'Protect, Respect and Remedy' and Guidelines for Implementation (2008, 2011)	2008	Private and public sector Larger-scale mining	UNOHCHR	Online commentary by multiple stakeholders	Not specified
Berlin II Guidelines for Mining and Sustainable Development (2002)	2002	Public and private sector Larger-scale mining	UN	None mentioned	Not specified
Environmental Guidelines for Mining Operations (1998)	1998	Public and private sector Medium- and large-scale mining	UNDESA, UNEP	Outcome of Round Table	Not specified
Mining Policy Framework Assessment	2013	Public sector ASM, larger-scale mining	Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF)	Based on a survey on mining but surveyed groups are not identified	Not specified

Appendix C

See Table C2

Table C2
Overview of certification schemes and standards for the extractive sector.

Name	Inception	Addressee	Lead actor	Consulted actors	Elements covered	Monitoring	Adherence to UN human rights framework	Adherence to OECD Guidelines
Initiative for Responsible Mining Assurance (2018) Certification	2018	Private sector Larger-scale mining	IRMA secretariat	Multiple stakeholder groups: NGOs, representatives from affected communities, trade unions, governments, academics, retailers	Not specified	Third-party audit, including on-site visits. Certificate is valid for 3–5 years	Guiding Principles on Business and Human Rights, Guideline on Indigenous Peoples' Issues, Declaration on the Rights of Indigenous peoples, Bill of Human Rights, Right to Water	Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas
International Council on Minerals and Metals (ICMM) Principles (2015) and Position Statements (2017)	2003, 2017	Private sector Larger-scale mining	International Council on Minerals and Metals (ICMM)	None mentioned	Not specified	Annual third-party assessment of sustainability reports	Guiding Principles on Business and Human Rights, ILO Convention 169, Guidelines on Indigenous Peoples' Issues, Human Right to Water	OECD Guidelines on Multinational Enterprises
Fairmined Standard Certification (2014)	2012	Private sector ASM	Alliance for Responsible Mining (ARM), Fairtrade	Multiple stakeholder groups: NGOs, jewelers, refiners, artisanal and small-scale mining organizations, industry organizations, academics, government representatives	Precious metals	Annual third-party audit, including on-site visits	Universal Declaration of Human Rights, UN declarations regarding the cultural, social and economic rights of individuals, ILO Convention 169	Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas
Conflict-free Gold Standard (2012)	2011	Private sector Larger-scale mining	World Gold Council (WGC)	Multiple stakeholder groups: representatives from governments, international organisations, supply chain participants, investors, academia, trade unions, and civil society organizations	Gold	Self-reporting template for standard fulfillment	Business and Human Rights (in areas of high conflict)	Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas
Chain of Custody Certification (2012)	2005	Private sector ASM, larger-scale mining	Responsible Jewellery Council (RJC)	Online commenting function	Precious metals	Third-party assessment of self-report, certificate valid for 1–3 years	Guiding Principles on Business and Human Rights, Bill of Human Rights, Declaration on the Rights of Indigenous Peoples	Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas
Extractive Industries Transparency Initiative (EITI) (2016)	2009	Public sector Larger-scale mining	UK government	Multiple stakeholder groups, participants not specified	Not specified	Annual self-reporting, third-party assessment of reports	None mentioned	None mentioned
Environmental, Health and Safety Guidelines	2007	Private sector Larger-scale mining	International Finance Corporation (IFC) / World Bank (WB)	None mentioned	Not specified	Second party assessment, on-site visits	None mentioned	None mentioned
Environmental, Health and Safety Guidelines for Mining	2007	Private sector Larger-scale mining	International Finance Corporation (IFC) / World Bank (WB)	None mentioned	Not specified	Second party assessment, on-site visits	None mentioned	None mentioned
Environmental and Social Performance standard (2012)	2006	Private sector Larger-scale mining	International Finance Corporation (IFC)	None mentioned	Not specified	Annual monitoring report assessed by second party, periodic on-site visits	Free, prior and informed consent, general mention of human rights	None mentioned
Environmental and Social Standard (2017)	2017	Public and private sector Larger-scale mining	World Bank (WB)	None mentioned	Not specified	Second party, on-site visits	Universal Declaration of Human Rights	None mentioned

Appendix D

See Table D3

Table D3

Integration of water dimensions in guidelines and certification schemes.

Across: dimensions of water use Down: Certification scheme/guideline	Year of inception	Public health (drinking and hygiene)	Economic dimension (livelihoods)	Cultural & spiritual dimension (traditional & religious practices)
Due Diligence Guidance for Meaningful Stakeholder Engagement in the Extractive Sector (OECD 2017)	2017	Mostly: public health implications of polluted groundwater sources, implications of reduced water quantity (p. 46) Not mentioned	Yes: reliance of communities on water for livelihoods (p. 46–47) Not mentioned	Somewhat: water is not explicitly mentioned but importance of environmental resources for cultural and spiritual practice is acknowledged (p. 46) Not mentioned
Due Diligence guidance for responsible supply chains of minerals from conflict-affected and high-risk areas (OECD 2016)	2010			
Guidelines for multinational enterprises (OECD 2011)	1976	Somewhat: water not mentioned but pollution to be limited and human health protected (p. 43, 45) Yes: implications of water degradation on human health (p. 16)	Not mentioned	No mentioned
Toolkit and Guidance for Preventing and Managing Land and Natural Resources Conflict. Conflict Prevention in Resource-rich Economies (EU-UN 2012)	2012		Yes: uses by the extractive sector can create scarcity, implications of water degradation on food production and economic activities (p. 12, 16)	Mostly: cultural dimension of water mentioned as part of a case study (p. 14)
Framework on Business and Human Rights 'Protect, Respect and Remedy' and Guidelines for Implementation (UNOHCHR 2011, UNHRC 2008)	2008	Not mentioned	Not mentioned	Not mentioned
Berlin II Guidelines for Mining and Sustainable Development (UN 2002)	2002	Yes: international standards for drinking water quality as benchmarks for national legislation (p. 13, 26) Yes: drinking water quality standards are mentioned as benchmark which effluents need to meet (p. 7, 9) Yes: health hazard of untreated wastewaters (p. 9, 93) Yes: water as a human right, and as essential for wellbeing (p. 4) Mostly: respect human health (not specifically related to water), joint monitoring of water and avoidance of harmful substances (p. 17, 26)	Not mentioned	Not mentioned
Environmental Guidelines for Mining Operations (UNDESA and UNEP 1998)	1998		Not mentioned	Not mentioned
Initiative for Responsible Mining Assurance (IRMA 2018)	2018		Mostly: water contamination and impacts on livelihoods (p. 6) Yes: value of water for livelihoods (p. 4)	Yes: cultural impacts of mining and water contamination (p. 6, 42) Yes: recognition of cultural value and customary practices of indigenous peoples (p. 4) Somewhat: respect protected areas and assume community beliefs and values (not specifically related to water) (p. 17, 66)
International Council on Minerals and Metals Position Statement on water stewardship (ICMM 2017)	2003, 2017		Not mentioned	Not mentioned
Fairmined Standard (Fairmined 2014)	2012		Not mentioned	Not mentioned
Conflict-free Gold Standard (WGC 2012)	2011	Not mentioned	Not mentioned	Not mentioned
Chain of Custody Certification (RJC 2012)	2005	Not mentioned	Not mentioned	Not mentioned
Mining Policy Framework Assessment (IGF 2013)	2013	Not mentioned	Mostly: possible use conflicts with agriculture mentioned but only for arid areas (p. 36) Not mentioned	Somewhat: cultural heritage mentioned but not specifically regarding water (p. 11) Not mentioned
Extractive Industries Transparency Initiative Standard (EITI 2016)	2009	Not mentioned	Not mentioned	Not mentioned
Environmental, Health and Safety Guidelines for Mining (IFC and WB 2007a), Environmental, Health and Safety General Guidelines (IFC and WB 2007b)	2007	Yes: drinking water quality standards mentioned under the heading of community health (p. 25) Yes: drinking water quality standards mentioned under the heading of community health (p. 77) Yes: limit impacts on ecosystem services that might compromise community health, such as pollution of freshwater (p. 2, Standard 4: Community Health)	Yes: irrigated agriculture and water use for food production (p. 2) Yes: irrigated agriculture and water use for food production (p. 77) Yes: avoid and minimize restriction on use of natural resources such as marine and aquatic resources, freshwater (p. 2 Standard 5: Land Acquisition and Involuntary Resettlement)	Somewhat: conservation demands that are no direct use mentioned in relation to water (p. 2) Not mentioned
Environmental and Social Performance standard (IFC 2012)	2006			Mostly: acknowledges physical and economic displacement that can result from limited access (p. 5 Land Acquisition) and understands sacred waterways or water bodies as cultural heritage that needs to be protected but limited to indigenous peoples (p. 5, Standard 7: indigenous peoples)
Environmental and Social Standard (WB 2017)	2017	Yes: Freshwater for drinking purposes (p. 19), pollution control to avoid adverse health effects on communities (p. 39)	Somewhat: projects need to take account of and mitigate impacts on other natural resource tenures and uses (p. 20)	Yes: importance of natural environment for cultural ecosystem services (p. 19), risks to cultural heritage to be assessed and mitigated (p. 20), water bodies as carriers of cultural heritage (p. 82, 85)

Appendix E. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.envsci.2020.04.011>.

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