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Mining governance in the Philippines: interactions among governance mechanisms and stakeholder experiences

Cecilia Tortajada^{1,*} , Justine Perry T Domingo^{2,3} , Richard Williams^{2,4} , Karen A Hudson-Edwards⁵ , Antonio P Contreras⁶ , Decibel V Faustino-Eslava⁶ , Evaristo Niño T Cando⁷ , Danesto B Anacio⁶ , Thaddeus P Lawas⁶ , Loucel E Cui⁶ , Juan Miguel R Guotana⁶ , Jenielyn T Padrones⁸ , Rosemarie Laila D Areglado⁶ , Ma Ericha M Amante⁶ , Kit Felian C Tenio⁹ , Francis Ian Gonzalvo⁶ , Manilyn Casa⁶ , Earvin Jon Guevarra⁶ , Dhannielle Grace P Bernardo⁶ and Kim Bryan N Cabrera⁶

¹ School of Social and Environmental Sustainability, University of Glasgow, Dumfries, United Kingdom

² School of Geographical and Earth Sciences, University of Glasgow, Glasgow, United Kingdom

³ Department of Environmental Science, Ateneo de Manila University, Quezon City, Philippines

⁴ Earth Sciences New Zealand, Hamilton, New Zealand

⁵ Camborne School of Mines and Environment and Sustainability Institute, University of Exeter, Exeter, United Kingdom

⁶ School of Environmental Science and Management, University of the Philippines Los Baños, Los Baños, Laguna, Philippines

⁷ College of Human Ecology, University of the Philippines Los Baños, Los Baños, Laguna, Philippines

⁸ College of Forestry and Natural Resources, University of the Philippines Los Baños, Los Baños, Laguna, Philippines

⁹ Institute of Tropical Ecology and Environmental Science, Visayas State University, Baybay City, Leyte, Philippines

* Author to whom any correspondence should be addressed.

E-mail: cecilia.tortajada@glasgow.ac.uk

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Abstract

Mining governance is essential for balancing mineral development with environmental protection, social equity, and sustainable resource management. In the Philippines, mining governance is implemented through regulatory, social, and community-based mechanisms that seek to protect indigenous rights, promote community development, and formalize artisanal and small-scale mining (ASM). However, limited research has examined how these governance mechanisms interact in practice and how they collectively influence governance outcomes. This study investigates the interactions among governance mechanisms, institutional relationships, and stakeholder experiences in shaping mining governance in the town of Itogon, Benguet Province, Philippines, where large-scale mining and ASM coexist. Data were collected using a key informant interviews and focus group discussions involving government agencies, mining companies, Indigenous Peoples' representatives, local government officials, community leaders, and ASM stakeholders. The data were then analyzed using thematic analysis and interpreted using a political ecology framework. The findings indicate that mining governance is characterized by centralized decision-making, uneven stakeholder participation, barriers to equitable access to formal governance arrangements, fragmented institutional coordination, persistent environmental governance challenges, and unequal distribution of mining benefits. Although existing governance mechanisms provide an important institutional framework, their implementation is shaped by power relations, institutional capacity, and local socio-environmental conditions, resulting in different experiences and outcomes among stakeholder groups. The results demonstrate that mining governance is better understood by examining the interactions among governance mechanisms, institutions, and stakeholder experiences rather than individual governance instruments in isolation. These findings provide an integrated understanding of mining governance and offer empirical evidence to support more transparent, inclusive, and environmentally sustainable governance of mineral resources in the Philippines and other resource-dependent regions.

1. Introduction

Mining plays a critical role in the economic development of many mineral-rich countries, contributing to national revenues, employment, industrial growth and the supply of strategic minerals required for global development [1]. At the same time, mining presents significant governance challenges because mineral extraction often involves competing environmental, economic, social, and cultural objectives [2–4]. Achieving sustainable mining therefore depends not only on the existence of mineral resources or regulatory frameworks, but also on governance systems capable of balancing resource development with environmental protection, community well-being, and the rights of affected populations [5–7]. These challenges have placed mining governance at the centre of international debates on sustainable development and natural resource management (Bastida, 2020) [8].

The Philippines illustrates these governance challenges. The country is among the most mineral-rich countries globally, with the third largest deposits of gold, fourth for copper, fifth for nickel, and sixth for chromite. Mineral rents (difference between the value of production at world prices and total production costs for tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate) [9] rank the country among the highest in the world relative to land area, comparable to major producers such as Australia and Peru. However, ensuring that the substantial mineral wealth of the country is translated into inclusive and sustainable socio-economic development and environmental protection remains a challenge that needs to be addressed.

Over the years, various legal and regulatory frameworks have been developed to address social and environmental impacts of mining. These include the Philippine Mining Act of 1995 [10], the Indigenous Peoples Rights Act (Republic Act No. 8371) [11], the People's Small-Scale Mining Act of 1991 (Republic Act No. 7076) [12] and its revision (DAO No. 7076) [13], which introduces *Minahang Bayan*, government-designated zones that allow small-scale miners to operate legally and responsibly, as well as executive order 130 [14] and lifts a nine-year moratorium on new mineral agreements. Additionally, related administrative orders issued by the Department of Environment and Natural Resources (DENR) and its attached agencies such as the Mines and Geosciences Bureau (MGB) and Environmental Management Bureau (EMB). Relevant policies include the Environmental Protection and Enhancement Program (EPEP), the Social Development and Management Program (SDMP), and the free, prior and informed consent (FPIC) process that is overseen by the National Commission on Indigenous Peoples (NCIP) [15].

The implementation of these governance arrangements is ultimately realized within specific local contexts where multiple institutions, stakeholder interests, and socio-environmental conditions converge. Benguet Province provides a particularly important setting for examining these governance processes.

Benguet is home to the oldest mining activities in the country as well as several large-scale mining (LSM) operations, many of which have been active for decades [16–19]. Alongside these, artisanal and small-scale mining (ASM) practices continue to play a significant role in the region's cultural traditions and economic livelihood (figures 1 and 2). Despite national legal, regulatory, and policy instruments, concerns continue to be raised in the province about their weak enforcement and resulting environmental degradation, health risks, and inequitable distribution of mining benefits [20]. There are also long-standing problems related to the rights of Indigenous Peoples (IPs) over ancestral domains, the lack of meaningful community consultation, and the marginalization of alternative livelihood initiatives. Artisanal and small-scale miners, who have operated informally for generations, often face legal uncertainty, lack of support, and inconsistent recognition from regulatory agencies [21]. Mining in Benguet thus intersects with questions of economic development, environmental management, IPs' rights, and local governance. This makes it a particularly suitable case for studying mining governance in the Philippines.

Existing research has generated important insights into multiple dimensions of mining governance in the Philippines, including IPs' rights, community participation, environmental management, benefit-sharing and ASM [19, 22, 23]. These studies have substantially advanced the understanding of individual governance mechanisms and the challenges associated with their implementation. However, comparatively less attention has been given to how these mechanisms interact within a shared governance system and how they are experienced and interpreted by the diverse institutions, organizations, and communities responsible for implementing, regulating, and living with mining activities. Examining these interactions is important because governance outcomes emerge from individual legal and policy instruments as well as from the relationships among institutions, governance mechanisms, and stakeholder experiences.

This study addresses this gap through a qualitative case study of mining governance in Itogon, Benguet, interpreted using a political ecology framework. To the authors' knowledge, this is the first study to examine holistically the interactions among three major Philippine mining governance

mechanisms—the FPIC process, the SDMP, and *Minahang Bayan*, the government-designated system for formalizing ASM—within a single analytical framework. Drawing on key informant interviews (KIIs) and focus group discussions (FGDs), involving government agencies, mining companies, IP representatives, local government officials, community leaders, and ASM stakeholders, the study examines the mining governance in Itogon, Benguet. It explains how interactions among governance mechanisms, institutional relationships and stakeholder experiences shape mining governance in practice. In doing so, it advances understanding of mining governance beyond the analysis of individual governance mechanisms and identifies evidence-based policy directions that emerge from the empirical findings.

The remainder of the paper is organized as follows. Section 2 presents the political ecology framework that guides the analysis. Section 3 describes the qualitative case study methodology. Section 4 presents the empirical findings derived from the interviews and FGDs. Section 5 discusses the governance dynamics emerging from the findings, examines their implications through a political ecology perspective, identifies the study's contribution to mining governance scholarship, and outlines key policy directions supported by the evidence. The final sections discuss the study's limitations, identify priorities for future research, and conclude by reflecting on the broader implications of the findings for understanding mining governance.

2. Theoretical framework: political ecology of mining governance

Political ecology offers a critical framework for examining how power and politics shape environmental governance. Foundational scholars [24] emphasize multi-scalar power relations, a '*chain of explanation*' linking global economic forces to local environmental change and challenge apolitical narratives of resource degradation by foregrounding structural power and inequity. It is also emphasized [25] that political ecologists are centrally concerned with understanding whose environmental uses, claims, and perceptions are prioritized, and the underlying reasons for such dominance. In other words, environmental outcomes are the result of contests over power, access, and meaning, rather than neutral policy decisions.

Four key concepts from political ecology, namely power, access, dispossession and hazardscapes, provide a rigorous lens to analyze mining governance in Benguet. Each concept is useful in revealing the socio-political dynamics behind resource conflicts and governance in this indigenous mining region.

2.1. Power and resource control

Power asymmetries underlie much of mining governance, as state and corporate actors typically command the authority, legal mandates, and capital necessary to control mineral extraction. Foundational political ecology scholarship emphasizes that environmental outcomes are structured by multi-scalar power relations linking global economic forces to local resource control [24]. In extractive contexts, such power is often maintained not only through legal and institutional mechanisms but, at times, through coercion, exclusion, and forms of structural violence that accompany resource frontiers [26]. In the Philippines, under a neoliberal policy regime, the balance of power has tilted further toward industry and the state. The liberalization reforms of the 1990s strengthened mining capital while narrowing oppositional space, effectively shifting decision-making arenas into state agencies and corporate boardrooms. This creates an uneven playing field in which indigenous communities and local governments struggle to meaningfully influence mining outcomes.

However, power is not absolute: it is negotiated and contested. Accounts refer to a situation when, after a major gold mine in Benguet closed in the 1990s, thousands of retrenched small-scale miners illicitly re-entered the company's concession [27]. Their persistent presence forced the Benguet Corporation to consider partnering with them. In essence, local miners leveraged their on-the-ground power in their sheer numbers and knowledge of the terrain to compel a new arrangement despite the company's formal authority. Such cases illustrate how community actors can push back against corporate power, resulting in hybrid governance (e.g. mining contracts or livelihood agreements). Power in political ecology is thus relational and dynamic. Even in a highly asymmetric context, resistance and negotiation by less powerful groups can reshape governance outcomes.

2.2. Access to mineral resources

The notion of access in political ecology shifts attention from legal ownership to the actual ability to benefit from resources. Ribot and Peluso's seminal 'Theory of Access' defines access as the ability to

derive benefits from things, as opposed to the narrower notion of property as a 'right' [28]. This broadened view treats access as a 'bundle of powers,' encompassing all the social and political-economic relations that enable or disable people's use of resources. In the context of Benguet, an access lens draws attention to the complex relationship between legally recognized rights and the practical ability of different actors to engage in mineral extraction. Although Philippine laws provide frameworks for small-scale mining and recognize IPs' rights, local miners may still face significant legal, administrative, and institutional constraints in securing formal access to mineral resources within their communities.

In Itogon and other Philippine mining regions, the formalization of small-scale mining can be complicated by overlapping mineral tenements, ancestral domain interests, existing resource-use arrangements, and centralized permitting requirements. Large-scale mineral rights granted under the country's mining regulatory framework may coexist with customary resource-use practices and local livelihood dependence on mineral extraction. In areas where existing mineral tenements cover gold-bearing zones, the availability of sites that can be formally accessed by small-scale miners may consequently be limited. Empirical studies suggest that these institutional and spatial constraints can contribute to the persistence of informal mining, even where legal mechanisms for small-scale mining and formalization are available [29, 30].

Access, then, is fundamentally about power and negotiation. Beyond the *jure* rights, an access perspective examines who can actually use or benefit from a resource and the mechanisms through which such benefits are obtained. These mechanisms may include licensing, kinship and community relationships, patronage, contractual arrangements, and other formal or informal negotiations that shape inclusion and exclusion in practice. In Benguet's mining communities, some indigenous and small-scale miners have maintained their livelihoods through locally negotiated arrangements and informal access strategies, including working agreements with mineral rights holders and the use of historical or existing mine workings. This underscores the importance of informal institutions, negotiated arrangements, and institutional ambiguity in governing access to mineral resources in the Philippines, where legality and informality frequently coexist within the same mining landscapes [29, 30].

2.3. Dispossession and accumulation

Political ecology has long focused on dispossession, or the processes by which communities are alienated from their land and resources, often to the benefit of external actors. Scholars [e.g. 24] have noted that capitalist expansion and state-led development projects can produce significant changes in land tenure, resource access, and local livelihoods, sometimes accompanied by environmental and social disruption. The concept of 'accumulation by dispossession' [31] has been used to describe processes through which assets and resource rights are transferred, consolidated, or reorganized in ways that facilitate new forms of capital accumulation. In resource-extraction contexts, these processes may involve changes in land tenure, the establishment of mineral rights and concessions, or the enclosure and formal regulation of previously accessible resource areas. For indigenous communities in the Philippines, such changes may intersect with customary land-use practices, ancestral domain interests, and long-standing livelihood relationships with mineral resources.

Dispossession is not only about the loss of land but also the loss of decision-making power and value extraction: who earns from the gold and who bears the risks. Studies of extractive industries across the Global South have highlighted how benefits and costs may be unevenly distributed among companies, governments, workers, and host communities. These patterns are shaped not only by corporate activities but also by legal frameworks, institutional capacity, market conditions, historical land-use arrangements, and the effectiveness of governance mechanisms.

Crucially, dispossession often goes hand in hand with resistance and adaptation. In Benguet, displaced small-scale miners have innovated ways to reassert access (as discussed above), and community resistance movements have at times halted or delayed new mining projects. The concept of 'powers of exclusion' is useful in understanding these processes because it draws attention to how regulation, markets, authority, and social norms can influence access to resources. Political ecology's emphasis on dispossession thus underscores both the cause of marginalization: structural processes that remove people from their resources; and the consequence: a restructuring of livelihoods and social relations as communities respond to being dispossessed.

2.4. Hazardscapes and socio-environmental risks

Finally, a political-ecological approach considers the creation of hazardscapes [32], defined as landscapes of risk and vulnerability produced through the interaction of social, political, economic, and environmental processes. Mining not only generates social conflict or economic transformation; it also reshapes

ecological systems and produces material conditions that expose communities to long-term environmental hazards. Hazardscapes therefore refer not simply to spaces where hazards exist, but to socially produced environments where vulnerability is unevenly distributed and historically embedded.

Previous work on hazardscapes [33] provides a useful framework for understanding how power and hazards intersect hazardscapes are not only physical spaces of danger but also social and political spaces in which institutions, knowledge, and decision-making processes influence how hazards are identified, prioritized, and managed. Hazardscapes thus combine material risks such as unstable mine wastes, contaminated rivers, degraded watersheds, and flood-prone settlements with the institutions and governance systems that shape how these risks are managed.

Political ecology emphasizes that disasters are rarely 'natural' in a purely ecological sense. Instead, environmental crises emerge from historically produced vulnerabilities linked to unequal development, weak governance, and uneven access to protection and resources. This perspective resonates with the concept of the 'risk society' [34], where modern development systematically generates new environmental dangers, and the notion of 'slow violence' [35], which refers to gradual and often invisible forms of environmental destruction that disproportionately affect marginalized populations. In mining regions, hazardscapes emerge through cumulative human and ecological disruption combined with selective regulation and uneven development.

In Benguet, the hazardscape of post-mining communities illustrates the fusion of environmental degradation and socio-political vulnerability. Decades of mining in Itogon have transformed the landscape through tunnelling, abandoned mine openings, degraded watersheds, and unstable tailings deposits. Forest loss and water contamination have undermined both ecological integrity and local livelihoods. It has been argued [20] that these hazards are direct outcomes of accumulation by dispossession through the expropriation of mineral lands, the externalization of environmental costs by corporations, and the exploitation of labour under precarious conditions. These processes intensified both environmental exposure and social vulnerability, leaving communities simultaneously dependent on and endangered by mining.

Hazardscapes are therefore not merely physical terrains of danger but also lived social conditions. Communities in mining areas experience chronic insecurity shaped by poverty, limited livelihood alternatives, and unequal access to state protection. IPs, artisanal miners, women, and poorer households often bear disproportionate environmental risks while possessing fewer resources for adaptation or recovery. Vulnerability thus becomes political and relational rather than simply geographic.

A tragic example occurred in 2018 when Typhoon Ompong (international name: Mangkhut) brought extreme rainfall and triggered widespread landslides in Itogon. Dozens of miners and community members were killed when slope failures affected settlements in the municipality. The disaster illustrates how extreme rainfall can interact with steep terrain, geological conditions, historical and contemporary land use, settlement patterns, and landscape modification. In a municipality with a long history of both large- and small-scale mining, historical mine workings and altered landscapes have also been identified as factors requiring consideration in hazard assessment and land-use planning. However, the relative contribution of mining activities to individual slope failures requires site-specific geotechnical and historical evidence and should be distinguished from the broader geological and meteorological conditions that generate landslide hazards.

Viewed through a hazardscape framework, the 2018 disaster demonstrates how an extreme environmental event can have severe social consequences where populations and livelihoods are located in hazard-prone areas. Questions regarding settlement safety, rehabilitation of historical mine sites, land-use planning, livelihood options, early warning, and institutional coordination are therefore central to understanding disaster risk in mining municipalities such as Itogon. Rather than attributing the disaster to a single activity or actor, the hazardscape perspective emphasizes the cumulative and interacting conditions that shape exposure and vulnerability over time.

Hazardscapes also involve competing forms of environmental knowledge. Mining corporations and state agencies often frame risks as manageable through technical interventions and regulatory compliance, while local communities experience hazards as everyday realities manifested in contaminated water, respiratory illnesses, unstable slopes, and declining agricultural productivity. Indigenous communities likewise possess localized ecological knowledge that may conflict with official technical assessments. These different knowledge systems are not necessarily mutually exclusive, but they may differ in how risks are identified, prioritized, and interpreted. Hazardscapes can therefore become arenas in which different perspectives on safety, development, environmental change, and acceptable levels of risk are negotiated.

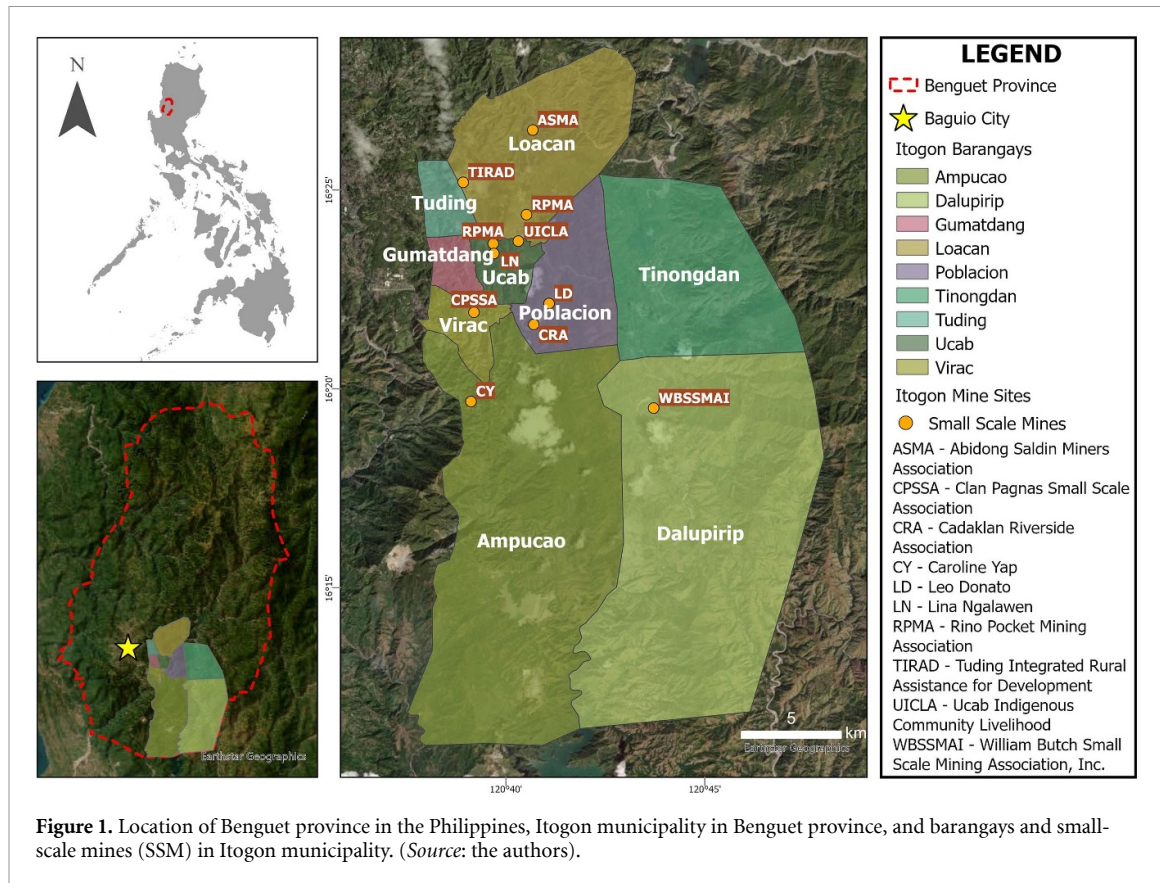


Figure 1. Location of Benguet province in the Philippines, Itogon municipality in Benguet province, and barangays and small-scale mines (SSM) in Itogon municipality. (Source: the authors).

Ultimately, the concept reinforces the need to analyze mining governance not only in terms of resource extraction and economic growth, but also in terms of the production and distribution of environmental insecurity. Governance systems do not merely regulate hazards; they actively shape the social geography of vulnerability itself. From a political ecology perspective, understanding mining in Benguet therefore requires examining how power, dispossession, access, and environmental degradation converge to produce uneven landscapes of risk and resilience.

3. Methodology

3.1. Study area

Benguet is the southernmost province of the Cordillera Administrative Region (figure 1). It is bordered to the north by Mountain Province, to the south by Pangasinan, to the east by Ifugao and Nueva Vizcaya, and to the west by La Union and Ilocos Sur. The province consists of 13 municipalities: Atok, Bakun, Bokod, Buguias, Itogon, Kabayan, Kapangan, Kibungan, La Trinidad, Mankayan, Sablan, Tuba, and Tublay. As of 2025, four out of 60 operating large-scale metallic mines in the Philippines are situated in Benguet. These are Benguet Corporation and Itogon-Suyoc Resources Inc (ISRI). In Itogon, Lepanto Consolidated Mining Company in Mankayan, and Philex Mining Corporation in Tuba (figure 2). Previous official estimates placed the number of small-scale miners at 25 000 [36], although the actual number engaged in ASM is likely higher. Figure 1 illustrates the location of small mines in Itogon, Benguet.

3.2. Data collection and analysis

Our study adopts a qualitative case study design, drawing on primary data collected through KIIs and FGDs, and complemented by a review of literature. The data were analyzed using thematic analysis.

Consistent with Yin's [37] conception of case study research, the study adopts a qualitative case study design to examine a bounded system within its real-life context. The case study approach is well suited to addressing 'how' and 'why' questions and enables an in-depth, contextually embedded investigation of complex social processes. To analyze the data produced through the case study, we employed thematic

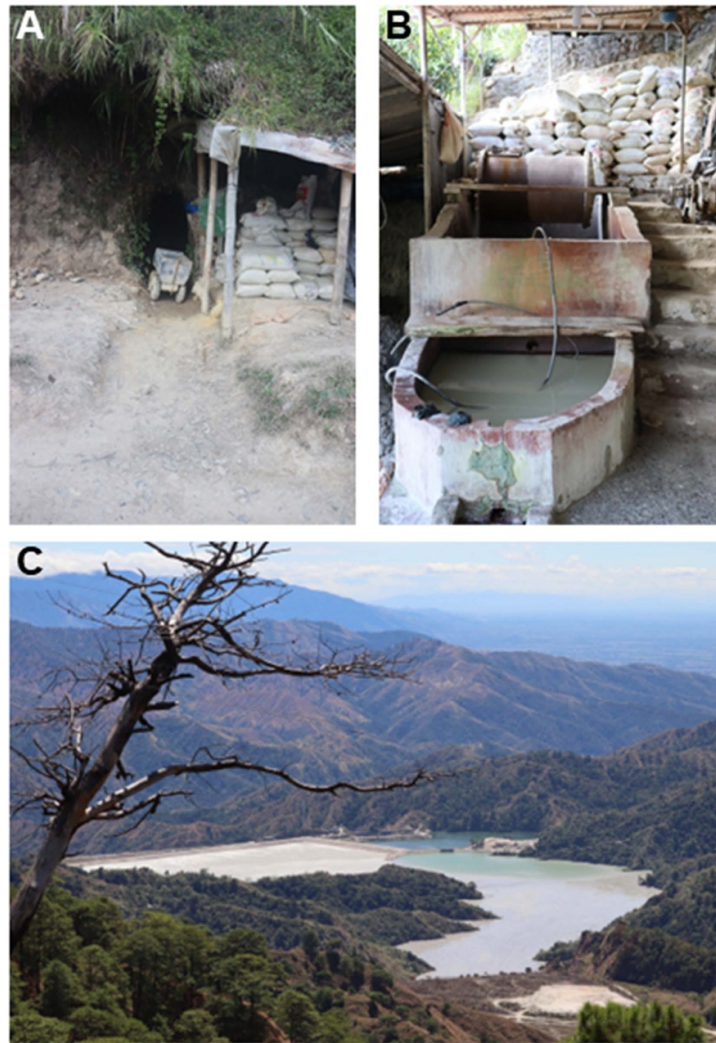


Figure 2. Mining in Benguet. Example of (a) a tunnel entrance to an artisanal small-scale mine (ASM) and (b) associated small-scale processing facility. (c) Tailings storage facility associated with the Philex large-scale mine. Photos were taken by the authors. The authors have authorization from Philex Mining Corporation to use the photograph (c).

analysis following Braun and Clarke's framework [38]. Thematic analysis provides a systematic and flexible analytic method for identifying, analyzing, and interpreting patterned meanings (themes) across a dataset. This approach facilitates rigorous interpretation while remaining sensitive to contextual nuance.

The case study design and thematic analysis offer methodological coherence, combining contextual depth with systematic analytical rigour in the examination of mining governance. With these methods, we developed systemic understanding and insights into how and why legal, regulatory, and policy mining mechanisms such as FPIC, SDMP, and *Minahang Bayan*, among others, are perceived and experienced by diverse actors in Itogon, Benguet. These comprise regional government agencies, mining companies, community and sector leaders, including the NCIP and academia.

The research covered eight barangays (akin to villages, the smallest administrative units in the Philippines): Dalupirip, Tuding, Ucab, Ampucao, Loacan, Gumatdang, Tinongdan, and Poblacion (figure 1).

Before data collection, the research team coordinated with key partner institutions, including Local Government Units (LGUs), regional agencies, and other relevant organizations (see tables 1 and 2). Field reconnaissance, site visits, and walk-throughs were conducted to validate and contextualize information obtained from secondary sources. Primary data were gathered through KIIs in December 2023, and FGDs in March and August 2024. Themes for the KIIs and FGDs were identified based on previous experience by members of the team working in the study area as well as on literature review.

The qualitative coding process was primarily guided by the study's analytical framework and research objectives while remaining sufficiently flexible to accommodate additional themes that emerged from the KIIs and FGDs. The coding was undertaken by the lead author to identify recurring themes across the

Table 1. Participating organizations in the key informant interviews.

Organization type	Organization name
Regional government agencies	Regional Office of Department of Environment and Natural Resources (DENR) Department of Environment and Natural Resources—Mines and Geosciences Bureau—Cordillera Administrative Region (MGB-CAR) Department of Environment and Natural Resources—Environmental Management Bureau—Cordillera Administrative Region (EMB-CAR) National Commission on Indigenous Peoples—Cordillera Administrative Region (NCIP-CAR)
Mining industries	Itogon-Suyoc Resources Inc. (ISRI) Philex Mining Corporation
Community and sector leaders	Barangays (villages) Loacan, Gumatdang, Tinongdan, Tuding, Ampucao, Ucab, Dalupirip and Poblacion

qualitative data. The codebook was developed and reviewed by all members of the research team, and the coding framework and interpretation of the themes were discussed collectively to promote consistency and transparency throughout the analytical process.

3.3. KIIs

A total of 15 key informants were interviewed, including four representatives from regional government agencies, two from the mining industry, and nine community and sector leaders (table 1).

Using a semi-structured format, the interviews explored institutional arrangements and captured participants' views on sustainable management practices within ancestral domains. Questions targeted the political, economic, social, technological, legal, and environmental aspects of mining operations, covering large-scale, small-scale, and artisanal activities, and concerns, among other topics. The questionnaire can be found in the supplementary material.

3.4. FGDs

Three sets of FGDs were organized in 2024: on 8 March in Diliman, Quezon City, Metro Manila, and on 5–6 August in Baguio City.

On 8 March, FGDs were conducted with representatives from government agencies, professional associations, and mining organizations. The discussions were held in Metro Manila, where the participating organizations maintain their central offices. To facilitate open and constructive dialogue, the FGDs were structured so that representatives of central government agencies and LSM companies participated separately from local stakeholders. This approach was adopted to minimize the potential influence of institutional dynamics between national and local actors and to provide a setting in which less-influential participants could express their views more freely. In addition, representatives of LSM companies were interviewed separately from small-scale mining groups because several questions explored perceptions of the effectiveness of the big brother–small brother scheme (BBSB) between large- and small-scale mining communities. Separating these groups was intended to encourage candid discussions of both the successes and challenges associated with the scheme. On August 5 and 6, 2024, the second and third FGDs took place at Baguio City. It gathered respondents from the Cordillera Administrative Region, including small-scale mining groups and regional, provincial and local government offices. These FGDs aimed to address critical issues related to small-scale mining practices, rules, and the social and economic effects on IPs and local communities. Participants are listed in table 2. The guiding questions can be found in the supplementary material.

Both the KIIs and FGDs were used to develop a nuanced and inclusive understanding of the social, political, environmental, cultural, and regulatory dimensions of mining.

4. Results

4.1. KIIs

This analysis synthesizes and contrasts the perspectives of three key stakeholder groups: government agencies, mining industry representatives, and community and sectoral leaders, on critical issues surrounding mining operations in Benguet. While all groups acknowledged the significant role of mining in regional development, their views diverged significantly regarding environmental sustainability, regulatory effectiveness, Indigenous rights, and long-term socio-economic impacts.

Table 2. Participating organizations in the focus group discussions.

8 March 2024	Organization	Number of Participants
	National Commission on Indigenous Peoples (NCIP)	2
	Philex Mining Corporation	2
	Department of Environment and Natural Resources—Environmental Management Bureau (DENR-EMB)	3
	National Power Corporation—Watershed Management Division (NPC-WMD)	3
	Department of Environment and Natural Resources—Biodiversity Management Bureau (DENR-BMB)	1
	National Commission on Indigenous People (NCIP)	1
	Philippine Society of Mining Engineers (PSEM)	1
	National Water Resources Board (NWRB)	2
	Philex Mining Corporation	1
	Benguet Corporation	1
5-6 August 2024	Department of Environment and Natural Resources (DENR)-Mines and Geosciences Bureau (MGB) Central Office	3
	Artisanal Gold Council of the Philippines	2
	Provincial Government of Benguet	6
	Itogon-Suyoc Resources Inc.	2
	Local Government of Itogon	3
	University of the Philippines Baguio	2
	Benguet Federation of Small-Scale Miners, Inc. (BFSSMI)	3
	Dontog Manganese Pocket Miners (DOMAPMA)	1
	Goldstream Pocket Miners and Community Livelihood Association, Inc. (GOPOMICLAI)	1
	Loacan Itogon Pocket Miners' Association (LIPMA)	1

4.1.1. Government agencies

Government agencies, particularly the MGB, EMB, and NCIP, largely emphasized the regulatory and developmental role of mining. They acknowledged mining as a critical economic driver, citing infrastructure development, job creation, and local tax revenues. An MGB-CAR official noted, for instance, that mining companies contribute to road and school construction and provide health services as part of their SDMP and Community Development Program. They also pointed to mechanisms like EPEP, FPIC, and SDMPs as safeguards for sustainable and socially acceptable mining. However, concerns about FPIC implementation were raised. As one EMB official stated, 'FPIC is often treated as a post-condition in the Environmental Compliance Certificate process, reflecting challenges in its genuine implementation.' Moreover, there was support for *Minahang Bayan* as a more organized alternative to illegal small-scale mining, albeit hindered by complex application requirements and evolving legal frameworks. Regarding environmental sustainability, both MGB and EMB acknowledged ongoing efforts. MGB highlighted their regular 'monthly monitoring of the river systems affected by mining (total suspended solids, pH, arsenic, zinc, lead, etc)' and noted that cultural preservation is mandated and included in SDMPs. EMB also emphasized 'pollution controls' and checking for compliance with laws to control toxic substances and hazardous and nuclear waste [39], air pollution control [40], and clean water [41].

In terms of the protection of IPs' rights, the MGB confirmed, 'yes, some of the mining operations are located within ancestral domains, but they (companies) respect customs and traditions.' They also added that companies 'contribute to ritual needs and participate in their rituals.' Nonetheless, challenges in FPIC implementation were noted, with MGB acting as a neutral mediator in disputes, confirming '(We) investigate both the company and the complainant.' The agencies supported LSM, emphasizing its potential sustainability. MGB noted that large-scale operators 'use high technologies underground,' and mentioned that 'less accidents' occur under such conditions. EMB supported LSM 'as long as they comply with the permits and laws' but they also confirmed that 'there are still some stubborn (companies), maybe because they lack knowledge.'

MGB and EMB's views diverged on ASM. EMB supported ASM operations because of economic and livelihood reasons, but they recognized that ASM does not always comply with the regulations. MGB opposed unregulated ASM, saying 'there is direct discharge and no mitigation measures,' and 'they hide

from authorities.’ Conversely, they supported *Minahang Bayan*, noting ‘it is more organized’ and results ‘in more control compared to ASM.’

4.1.2. Mining industry

Industry representatives from firms such as ISRI and Philex Mining Corporation discussed mining as a responsibly-managed and highly beneficial activity. ISRI emphasized its use of progressive rehabilitation and environmental compliance (e.g. environmental performance report and management plan and compliance with environmental laws), as well as inclusive programs such as community employment and women’s participation in technical roles like welding and geology.

Philex Mining highlighted the broad socio-economic benefits of their operations, including scholarships, job opportunities, and support for socio-cultural activities such as traditional dances and rituals through the SDMP. They also stressed compliance with FPIC and social acceptability processes and confirmed that initial construction phases cannot proceed without community consent. Programmes such as the BBSB scheme [42] have been described as successful partnerships with IPs for the recovery of minerals from waste dumps, delivering both sustainable outcomes and meaningful benefits to local communities.

Employment and economic contributions were key highlights. ISRI reported that ‘Most employed are within the community, and 30% are local’, and that there were positions even for ‘female mining engineers, geologists, and welders.’ Philex stated they prioritized locals ‘as much as possible if they are qualified,’ and mentioned that 445 scholars received tuition and allowances, plus community infrastructure supported through SDMPs.

Industry informants acknowledged operation with ancestral domains. Philex confirmed, ‘Yes, there are two ancestral domains (Itogon and Tuba),’ and ISRI noted that they work with ‘claimants’ and IPs through schemes like BBSB. In this context, ‘partner IP groups and households further process ISRI’s waste dumps for potential extraction of minerals.’ Philex and ISRI described this model as ‘very helpful’ and sustainable.

Despite these affirmations, they acknowledged challenges. ISRI mentioned a recent complaint, and Philex cited issues such as ‘unpaid claims’ and ‘boundary disputes,’ which were resolved through tax-sharing agreements or other community-level interventions.

Health impacts were acknowledged but they were reportedly downplayed. ISRI admitted that ‘if uncontrolled/not compliant regulatory ailments due to exposure to metals’ may occur and result in respiratory diseases. Philex reported that it maintains employee health monitoring through medical records and programs such as a hearing conservation initiative and noted that non-occupational diseases were prevalent among workers.

On regulatory compliance, both companies confirmed adherence to FPIC and social acceptability processes. ISRI explained, ‘the first stage of the construction project needs their consent.’ Philex also confirmed compliance, emphasizing the oversight role of Multi-partite Monitoring Teams (MMTs) and other multi-sectoral bodies.

Regarding ASM, both companies expressed concerns. ISRI described it as ‘dangerous mining’ citing ‘unsystematic discharges.’ Philex pointed out that ASM operations generally lacked permits and facilities. ISRI considered that forming cooperatives was ‘possible.’ It also stressed that ‘the same requirement/compliance with the large-scale (mining) should be enforced.’

4.1.3. Community and sectoral leaders

The views presented in this section reflect the experiences and perceptions of community participants regarding both historical and contemporary mining activities in Itogon. These accounts provide important insights into how mining governance is understood and experienced locally. However, they should not be interpreted as independently verified findings regarding the compliance or performance of any specific mining company. Where stakeholder perceptions differ from those of industry representatives or government agencies, these differences are examined as part of the broader governance dynamics explored in this study.

Community members and sectoral leaders, many of whom are IPs or local residents, provided perspectives grounded in their lived experiences and long-term engagement with mining in their communities. While recognizing that mining has brought some benefits such as roads, jobs, and scholarships, they emphasized the uneven distribution of these gains, environmental degradation, health problems, and cultural erosion. According to representatives from Barangay Loacan, mining is a major livelihood source. However, some participants perceived that its benefits were not equally shared and that certain commitments associated with Memoranda of Agreements (MOAs) had not been fully realized within their communities.

The implementation of FPIC was also identified by several participants as an area of concern. Informants from Barangays Gumatdang and Tinongdan reported that, in their experience, consultations were often insufficient, and they perceived that FPIC was sometimes bypassed or only partially implemented.

Community leaders advocated strongly for the regulation of ASM through *Minahang Bayan* but cited numerous bureaucratic and financial obstacles. They also called for greater support in terms of equipment, technical training, and legal recognition, especially for cooperatives. Alternative livelihoods such as agriculture, eco-tourism, and traditional crafts were commonly suggested. One leader from Barangay Tinongdan noted the community's expectation to pursue more sustainable and self-determined development paths.

Environmental impacts were a recurring theme. A Tinongdan official declared that 'no mining should be allowed in watersheds. They cannot be rehabilitated and water circulation will be damaged.' Another official from Gumatdang alleged that rehabilitation activities associated with historical mining operations had been inadequate and associated these legacy operations with environmental damage, stating that 'there is no rehabilitation activities conducted by Benguet Corporation. It destroyed the area, even the river.' This account reflects the participant's perception of historical mining activities rather than a verified assessment of the company's current rehabilitation performance. Several participants noted that both large and small-scale mining contributed to health problems, such as respiratory diseases, due to chemical exposure and dust. Though some noted participation in clean-up drives, tree planting, and rescue trainings, others perceived that environmental mitigation activities had limited visibility or effectiveness within their communities. A Gumatdang official remarked, 'No social development responsibility,' expressing dissatisfaction with what the participant perceived to be limited reforestation and environmental initiatives undertaken by larger mining companies.

Consultation and the integrity of the FPIC process were contentious issues. Some Barangay officials were part of the MMT or Local Mining Regulatory Board (LMRB), but others reported exclusion. A Tinongdan official stated, 'sometimes they isolate us. They don not consult us,' adding that construction sometimes proceeded 'even when FPIC is not yet finished.' These statements reflect the experiences and perceptions of individual participants regarding consultation processes and community engagement. Another official from Tuding highlighted that only a few people benefit from the resources and expressed concern that some communities experienced limited long-term socio-economic benefits following the closure or departure of mining operations.

Disparities in economic benefit were also highlighted. A Loacan official acknowledged that mining 'provides education' but added that in the participant's view, large companies such as Benguet Corporation provided limited post-operational support to host communities following the completion of mining activities. Gumatdang and Tinongdan leaders expressed dissatisfaction over taxes and royalties being collected in far-off places, while they perceived that their communities received minimal returns.

Despite these grievances, small-scale and *Minahang Bayan* operations received broad support. 'Yes, [ASM] is the livelihood,' said a Gumatdang official. It was mentioned that although ASM lacked technology and used traditional methods, it is more community-oriented and sustainable when properly regulated.

There was consensus on the need for organizing small-scale miners into cooperatives. 'It is better to do this to resolve the problems. They will not be reprimanded by the government,' said a Loacan respondent. Some other respondents called for government subsidies, legal recognition, and capacity-building programs to improve compliance and sustainability.

The BBSB scheme received strong endorsement. Barangay officials described it as 'a very good practice' and 'very helpful,' citing how it allowed small-scale actors to extract residual minerals from mining waste and promoted economic inclusion without employer-employee hierarchies.

On the issue of mineral waste, communities raised concern over unextracted copper and silver being dumped into rivers. Leaders called for community-level recovery initiatives. One respondent said 'As long as there is a facility to extract, and it should be safe' and another stressed the need for 'equipment/machinery and training to know how to recover the minerals.'

Finally, community leaders emphasized alternative livelihood activities. Farming, livestock raising, and tourism were frequently suggested. A Tinongdan official stated, 'We cannot eat gold,' advocating for sustainable farming and irrigation development as viable paths to local economic self-reliance.

Topics of agreement and disagreement among the participants can be found in table 3.

Despite their differences, all stakeholders acknowledged the importance of inclusive governance, sustainable practices, and the development of alternative livelihoods. They agreed that mechanisms such as FPIC, SDMP, and *Minahang Bayan* require stricter implementation and broader institutional support to bridge the gap between economic development and social equity. Among the various approaches

Table 3. Points of agreement and disagreement during key informant interviews.

Theme	Points of Agreement	Points of Disagreement
Economic benefits of mining	All stakeholders agreed that mining contributes to local and national economic development through jobs, infrastructure and tax revenues.	Communities argued that economic benefits were unevenly distributed and largely benefit outsiders or select individuals.
Environmental safeguards	There was a shared acknowledgement of mechanisms like EPEP and SDMP, and compliance to environmental laws.	Community leaders claimed that environmental safeguards were poorly implemented, resulting in degradation and health risks.
FPIC implementation	Stakeholders recognized the importance of FPIC as a legal and ethical requirement.	Industry and government cited compliance, while communities argued that FPIC was often tokenistic and lacked genuine consent.
Community engagement & participation	All groups acknowledged the need for community involvement and consultations.	Communities felt that consultations were symbolic and lacked transparency, while agencies and industry claimed they follow procedures.
Distribution of mining benefits	There was general agreement that mining provided benefits like roads, education, and health programs.	Communities criticized the skewed benefit-sharing and limited impact on marginalized groups.
Regulation of small-scale mining (<i>Minahang Bayan</i>)	Stakeholders agreed that small-scale mining needed to be regulated for safety and sustainability reasons.	Communities highlighted bureaucratic barriers and lack of support, while government pointed to the legal mechanisms in place.
Alternative livelihoods	All groups recognized the value of promoting alternative livelihoods to reduce dependence on mining.	Industry focused on mining as a long-term driver; communities advocated for greater support for alternative livelihoods such as agriculture, eco-tourism, and crafts.

discussed, the BBSB scheme emerged as a particularly promising model for community-industry partnership.

Ultimately, whether mining remains a viable pathway for regional development in Benguet will depend on the ability of all stakeholders to address these underlying tensions through collaborative and accountable actions.

4.2. FGDs

This section synthesizes and compares the perspectives of two groups: local leaders and community stakeholders (Group 1), and community members and Indigenous representatives (Group 2). Both groups recognized the importance of developing alternative livelihood opportunities beyond mining. However, their views diverged regarding ASM, with Group 2 opposing ASM operations and characterizing them as irresponsible.

4.2.1. Local leaders and community stakeholders (Group 1)

Participants stressed the fragile state of their local environment, especially watersheds. Some of them perceived that historical LSM operations had generated limited long-term benefits for host communities while leaving environmental issues that communities continue to experience today. For instance, one leader observed that after a large mining company extracted the resources ‘they left’ and nearby barangays suffered as ‘water resources continue to diminish.’ This statement reflects the participant’s interpretation of historical mining activities rather than an independently verified assessment of company performance.

Many shared the view that mining has a finite horizon, ‘Mining has a limited time because the resources will exhaust’ and will ultimately benefit only a small number of people. Some participants expressed a desire to see water resources and forests in mined areas restored over time. One participant suggested that ‘I wish there were no mining activities [in watersheds] to help the restoration of water

resources,' although they acknowledged that, at present, many community members rely on mining for their livelihoods.

Participants also recognized ASM as a primary source of livelihood for local people and described it as largely traditional. They also noted that gold mining income helped families. One mentioned that with small-scale mining 'there is a big chance that they can help their children go to school' though 'it depends on luck,' and they cautioned that 'gold can be exhausted.' In contrast, they felt LSM had not significantly alleviated local poverty in their area, historically providing little community development. On employment, they observed that large companies often hire outsiders: 'in the large scale, they hire more workers in the lowland compared to the upland,' whereas small-scale mining involves local workforce entirely. Opportunities for women existed mainly in processing roles for small-scale operations as women typically 'are not entering the tunnels,' indicating a gendered division of labour in mining.

Local leaders had direct experience with mining governance structures. They were aware of the LMRB/PMRB and some participated in organizing miners to legalize their status. They generally supported initiatives to formalize and regulate mining at the community level. For example, they favoured the *Minahang Bayan* programme 'so that we can benefit using our own resources.'

In their view, compliance with *Minahang Bayan* permit requirements would help ensure that operations adhere to established rules. However, they acknowledged several challenges, particularly the lack of modern equipment and adequate facilities among small-scale miners. The group noted that ASM operations remain largely low-tech, 'more use of traditional ways' and would benefit from upgraded equipment and additional training. They recommended greater government support, including training programmes and subsidies for small miners operating within *Minahang Bayan* areas, to improve both safety and efficiency.

Participants expressed strong concerns about how larger mining operations fulfil their obligations. Several participants referred to instances in which they believed commitments contained in MOAs had not been fully implemented. One participant noted, 'Sometimes they still violate... MOA. It is not complied, [promised] activities or projects are not done in the community.' These observations represent stakeholder perceptions and were not independently verified through documentary review of the relevant MOAs, compliance reports, or regulatory records. This perceived lack of implementation once operations commenced was identified by participants as a major source of frustration because they believed that some anticipated community benefits had not materialized. To address these concerns, participants emphasized the need for stricter government oversight and enforcement. They argued that authorities should apply mining regulations more rigorously and consistently: 'There should be a strict implementation of rules' to protect both the environment and affected communities. Participants also recognized that effective implementation depends not only on mining companies but also on the oversight roles of regulatory agencies and local governance institutions.

About specific policies, participants held nuanced views. They did not express strong support for expanding LSM. Any acceptance was conditional as it should depend on the programmes the communities will benefit from. In other words, they would support LSM only if it brought clear advantages to the local community. They were more unified in opposing environmentally risky practices such as open-pit mining on the grounds that 'are destructive' to the land.

Regarding the question of the 9-year moratorium [5], their responses were cautious or neutral. This suggests they were not keen on new large mining projects unless governance issues were addressed. Meanwhile, they strongly supported ASM as a community livelihood but recognized that it needs regulation. They remarked that not all small miners fully obeyed the rules reflecting a need for better oversight of ASM rather than a desire to prohibit it.

A recurring priority for participants was ensuring that mining activities meaningfully contribute to local development. Some participants expressed the view that existing community development initiatives associated with mining had not adequately addressed local needs. One participant remarked that 'No social development responsibility' had been observed in relation to certain initiatives, reflecting dissatisfaction with the perceived outcomes of community development and environmental programmes. These statements represent participants' assessments and should be interpreted as stakeholder perceptions rather than verified evaluations of corporate social development programmes. To address this, they emphasized the need for communities to have better access to mining-related benefits and funds. One specific proposal was that the environmental fee and funds such as the environmental guarantee fund [43], which are collected from mining companies, should be made accessible to communities rather than being managed solely by the MGB. Participants felt that communities should have a voice in how these funds are used or derive direct benefits from them, for example, by financing local environmental rehabilitation initiatives or community development projects. They also recommended formalizing

agreements for all miners, including those operating on a small scale, to clearly define roles and responsibilities. They argued that this would help institutionalize accountability across all levels of the mining sector.

Participants did not see mining as the only future activity for their area. Some of them discussed developing alternative livelihoods, especially farming, to reduce over-reliance on mining. They mentioned that during the COVID-19 pandemic, many local residents returned to farming, highlighting the sector's importance as a safety net. However, they also acknowledged significant challenges such that mining activities had damaged parts of agricultural land ('rice field was destroyed by small-scale mining') and inadequate irrigation and limited water access were major barriers to successful farming. In addition, some community members had lost interest in agriculture due to the quicker financial returns offered by mining, 'farmers do not want to farm, instead, they want to be employed in mining.' As a response, participants advocated for revitalizing the agricultural sector. 'Farming instead of mining,' one said, emphasizing that food security is more fundamental than minerals. They spoke of personal initiatives, such as starting farming businesses, and called for greater support, including improved irrigation systems and access to modern farming techniques. They viewed these alternative livelihoods as essential to securing the community's long-term socio-economic development beyond the mining era.

Participants were open to innovative arrangements in mining that could empower local communities. They responded positively to the BBSB scheme, in which a large mining company partners with indigenous groups or households to reprocess mining waste and recover residual minerals. They viewed this model as a win-win livelihood opportunity, providing an additional source of income through the recovery of gold from waste dumps 'It provided livelihoods.' In their view, such partnerships are sustainable and should be replicated and institutionalized in other communities. However, they also emphasized that these programs must be inclusive, 'Other associations should also be included, not only specific groups,' implying that benefits should extend to all qualified local groups rather than being limited to a select few.

The group strongly supported initiatives to recover valuable minerals from mine waste such as tailings. They agreed that extracting remaining copper, silver, and other minerals at the community level is a practical and forward-looking approach, but that they need capital and equipment to process waste material. With proper support, mine waste can become an economic opportunity for locals under a good governance framework. They suggested that government agencies, particularly DENR, should invest in enabling and supporting such efforts. Participants believed that resource recovery initiatives would provide an 'added commodity' for the community while also helping to reduce environmental pollution.

4.2.2. *Community members and indigenous representatives (Group 2)*

In this group, participants were more critical and cautious about mining. Their overriding concern was protecting the environment and community health, even if it meant limiting or stopping mining activities. They argued that in environmentally sensitive areas such as upland watersheds and ancestral lands, mining governance might best serve the community by preventing destructive mining altogether. When discussing how to strengthen organizations such as the mining regulatory board, one participant suggested 'the best is to stop mining' rather than just improving monitoring. The group strongly supported the continuation of the moratorium on new mining agreements. Their view was firmly against open-pit mining.

The group expressed a general mistrust of LSM operations. Many of the participants did not personally support having large mines in their locality, 'If [it were up to] me, I do not support LSM.' However, they acknowledged that large-scale operations already exist. In such cases, they insisted that mining companies 'must protect the environment and minimize destruction.' The group was not convinced that large companies fully adhere to regulations. They commented that companies might follow some laws but 'not all.' In their experience, compliance can be selective, and loopholes are exploited. On technical capacity, the group recognized that modern large-scale mines were technologically advanced in extraction methods compared to the past. Yet, increased efficiency in extraction was not seen positively by itself; in fact, it raised concern that resources would be extracted faster, potentially leading to more rapid depletion and harm. They did not consider the current LSM sustainable. One reason was that eventually 'resources will decline, and the environment will continue to be damaged' under the present mode of operation. They also expressed doubt about companies' commitment to ongoing monitoring of social and environmental impacts. When asked if mining companies monitor their impacts, the response was 'No. LGUs are the ones [which] do monitoring.' Their view is that companies were not self-regulating effectively, and the responsibility fell to local authorities who may not have sufficient capacity.

Unlike Group 1, Group 2 did not view ASM through a favourable lens. They opposed ASM operations in their current form because 'they destroy the environment.' Participants described many ASM

activities as ‘irresponsible’ with regard to following regulations. They pointed out that artisanal miners often lacked the means to mitigate environmental impacts. For example, there is ‘no capacity to develop [a] tailing dam’ to properly contain mining waste. Because of this lack of proper facilities and technology, ASM in their area has led to problems such as siltation of rivers, uncontrolled tunnelling, and unsafe conditions. The group was asked whether they think ASM could ever be sustainable and their answer was a firm ‘no’; that it was inherently unsustainable in the way it was currently done.

This perspective highlights a significant divergence: Group 2 viewed unregulated or poorly regulated small-scale mining as nearly as problematic as large-scale operations. At the same time, they reflected on why individuals continued to engage in ASM. They acknowledged that poverty and the need for immediate income were key drivers. Locals see ASM as ‘easy money’ and something they can start with ‘their own investments’ without waiting for other economic opportunities. Thus, although they disapproved of the practice, they understood the socio-economic pressures that compelled people to participate. The group also considered potential solutions for ASM. In principle, they agreed that organizing miners into legal cooperatives or designated *Minahang Bayan* areas could provide a more structured and responsible approach, ‘Would it be the best to organize their artisanal miners? Sure. There were efforts but [they] did not last.’ They noted that initiatives such as local small miners’ associations and the establishment of *Minahang Bayan* sites had previously been attempted, but these efforts were short-lived. The failure of these initiatives reinforced scepticism within Group 2 about the effectiveness of formalization alone. They felt that simply creating organizations was insufficient unless those bodies remained active and consistently enforced discipline among their members.

The group offered a few specific suggestions for improving bodies such as the LMRB, aside from the more radical proposal of stopping mining altogether. One consistent recommendation, however, was the need for stronger enforcement by national agencies. DENR should implement and enforce, not politicians.’ This statement suggests that they perceived local political leaders as a weak link, perhaps too conflicted in enforcing mining rules. They would prefer a depoliticized, firm regulatory approach in which even small-scale operations are held accountable. Their views on *Minahang Bayan* were similarly shaped by distrust. They regarded these operations as, in practice, largely indistinguishable from ASM. When asked to elaborate, they argued that *Minahang Bayan* sites can be just as ‘destructive and irresponsible’ as unpermitted ASM. In their view, simply designating an area as ‘*Minahang Bayan*’ does not automatically result in more responsible or environmentally conscious practices unless it is accompanied by effective enforcement and genuine behavioural change.

Similar to Group 1, Group 2 also emphasized the importance of developing alternative livelihoods beyond mining. They promoted farming and other sustainable economic activities as essential for the area’s long-term socio-economic development, particularly for future generations. Some participants themselves had agricultural backgrounds or returned to farming when mining incomes declined.

Group 2 identified the strengthening of agriculture through improved irrigation infrastructure and the adoption of modern farming techniques as a necessary path forward. They suggested that if viable employment and income opportunities were available outside the mining sector, fewer individuals would be compelled to engage in informal mining for ‘easy money.’ Overall, the group articulated a ‘water, food, and life first’ philosophy for governance. Their approach prioritized environmental protection, strict enforcement of regulations, and the development of alternative industries, ensuring that mining becomes a carefully considered option rather than a default means of survival. Topics of agreement and disagreement among the participants can be found in table 4.

5. Discussion

5.1. Mining governance as an integrated governance system

The findings indicate that mining governance in Itogon is best understood as a system in which formal institutions, governance mechanisms and stakeholder interactions collectively shape governance outcomes. Mechanisms such as FPIC, SDMP, and *Minahang Bayan* operate within a broader institutional setting where decision-making authority, participation, environmental management, benefit-sharing and livelihood concerns are closely interconnected. Examining these mechanisms individually provides important insights into specific aspects of governance. However, our results suggest that their effectiveness is shaped by how they interact within the wider governance system.

The interviews show that stakeholders do not disagree on the existence of governance institutions or regulatory mechanisms. Government agencies, mining companies, IP representatives, local governments and community members, all recognize the importance of governance arrangements intended to

Table 4. Focus group discussions' points of agreement and disagreement.

Discussion topic	Points of agreement	Points of disagreement
Economic contribution of mining	LSM contributed significantly to national/local economy; SSM had localized but significant contributions.	Extent and quantification of SSM's economic contribution varied by region.
Environmental impact and rehabilitation	SSM faces difficulties with compliance; rehabilitation standards more applicable to LSM.	Responsibility for rehabilitation in SSM is often disputed; views differed on who should fund and monitor.
Implementation of the mining Act of 1995	Gaps exist in enforcement and definition; updates and streamlining needed.	Different views on how much revision was needed and who should initiate reforms.
Government Agency Coordination	Overlapping mandates and poor communication among agencies.	Some suggested central coordination, others favored local autonomy.
Enforcement and sanctions	Weak enforcement for SSM; old laws and insufficient personnel were shared concerns.	Divergence on raising fines or giving LGU shares from penalties.
FPIC implementation	Need for better structure and support for FPIC implementation was agreed upon.	Debates on exemptions for academic projects and whether FPIC favors one party.
Social acceptability	Stakeholder participation in environmental impact assessments and planning phases was essential.	Varying confidence in community engagement mechanisms.
<i>Minahang Bayan</i> & formalization of SSM	Application requirements too stringent for SSM; support and subsidies needed.	Not all government agencies should subsidize facilities; concerns on corruption and accountability.
BBSB scheme	Scheme brings income but requires clear roles and accountability.	Some saw formalization as feasible; others cited practical limitations.
Use of ESG framework	ESG is valuable but difficult for SSM to comply with; LSM is more equipped.	Some preferred incentives vs mandates; unclear whether ESG should be compulsory.
Artificial intelligence in mining	AI offers potential benefits in safety and cost but raises employment concerns.	Opinions differed on AI's role. Some advocated limited use, others supported broader integration.

regulate mining activities, protect Indigenous rights, promote environmental management and support local development. However, they differ in how they assess the operation of these arrangements in practice. These differences are not simply competing opinions; rather, they reflect the different institutional roles, responsibilities and experiences through which stakeholders engage with the governance system. That is, governance is experienced differently according to the position that actors occupy within the institutional landscape. Government agencies primarily evaluate governance through regulatory implementation and administrative compliance. Mining companies emphasize operational compliance, environmental management and community development obligations. Local governments, IP representatives and community members place greater emphasis on participation, equitable access to decision-making, environmental conditions and livelihood outcomes. These differing perspectives do not necessarily indicate conflicting understandings of mining governance; instead, they demonstrate that governance performance is evaluated through different institutional and social experiences.

This interpretation contributes to a more integrated understanding of mining governance. Much of the existing literature examines governance instruments such as FPIC, SDMP or ASM formalization independently. The present findings suggest that understanding governance outcomes requires consideration of how these mechanisms operate as a whole within a broader institutional context. Participation influences perceptions of legitimacy; access to formal mining arrangements affects livelihood opportunities; environmental governance shapes community trust; and institutional coordination influences how governance responsibilities are implemented across multiple agencies. The governance mechanisms therefore reinforce, constrain or complement one another rather than operating as separate policy instruments.

5.2. Governance dynamics shaping mining governance

Mining governance in Itogon is shaped by a set of interrelated governance dynamics rather than by the operation of individual governance mechanisms. We present stakeholder perspectives separately, but their combined interpretation shows recurring patterns concerning the distribution of authority, participation in decision making, access to formal governance arrangements, environmental management, benefit-sharing and institutional coordination. These dynamics provide a more comprehensive explanation of how mining governance functions in practice.

A first governance dynamic concerns the distribution of authority across the mining governance system, suggesting that mining governance is characterized by a multi-level institutional structure in which national agencies retain primary regulatory authority while local governments, Indigenous institutions and communities participate through more limited and often consultative roles. This distribution of responsibilities reflects the legal and administrative framework governing the mining sector rather than the absence of local participation. However, the interviews indicate that stakeholders experience this governance architecture differently according to their institutional position. Government agencies generally emphasize regulatory implementation and statutory responsibilities, whereas local actors place greater emphasis on their capacity to influence decisions affecting their communities. Therefore, assessments of governance effectiveness depend on institutional performance as much as on the opportunities available to different actors to participate meaningfully within existing governance arrangements.

Participation emerges as a second governance dynamic closely connected to governance legitimacy. Across stakeholder groups there is broad recognition that consultation and community engagement are essential components of mining governance. However, stakeholders evaluate participation using different criteria. Institutional actors primarily emphasize compliance with legally prescribed consultation procedures, whereas IP representatives and community participants place greater emphasis on whether these processes provide genuine opportunities to influence decisions. Participation thus includes procedural and substantive dimensions. This distinction is important because it shifts attention from whether participatory mechanisms exist to how they are experienced by those expected to participate. Governance legitimacy depends on procedural compliance and on the extent to which affected communities perceive that their knowledge, concerns and priorities are meaningfully incorporated into decision-making processes or not.

Access represents a third governance dynamic identified by the findings. The interviews demonstrate broad support for regulating ASM through formal mechanisms such as *Minahang Bayan*. At the same time, participants consistently identify financial, administrative and technical barriers that constrain access to formal mining arrangements that suggest that legal pathways to formalization do not necessarily translate into practical access for all mining communities. Respondents do not question the value of formalization itself but highlight the importance of governance arrangements that recognize the operational realities and institutional capacities of artisanal and small-scale miners. This distinction indicates that access should be understood not only as a legal issue but also as an institutional one, where the ability to comply with regulatory requirements becomes an important determinant of inclusion within the formal governance system.

Environmental governance represents a fourth dimension through which mining governance is experienced and evaluated. Government agencies and mining companies primarily emphasize regulatory compliance, environmental monitoring and rehabilitation obligations, whereas communities assess environmental governance through the condition of watersheds, observed environmental degradation, rehabilitation outcomes and the implications for public health and local livelihoods. These perspectives should not be interpreted as mutually exclusive. Instead, they illustrate that environmental governance is evaluated through different forms of knowledge and experience. This distinction broadens the assessment of environmental performance beyond regulatory compliance alone and suggests that understanding environmental governance requires consideration of both institutional performance and community experience.

Benefit-sharing and livelihoods constitute a fifth governance dimension that further illustrates the complexity of mining governance. The evidence demonstrates broad recognition that mining contributes to employment, infrastructure, education and local development. At the same time, participants differ in their assessment of how these benefits are distributed and whether they generate sustainable improvements for mining communities. This distinction is particularly important because it demonstrates that the legitimacy of mining governance depends not only on the existence of benefits but also on their perceived fairness, accessibility and long-term contribution to community well-being. The findings therefore move beyond a simple assessment of whether mining provides benefits and instead raise broader questions regarding how governance arrangements influence the distribution of economic and social opportunities among different groups.

The evidence also highlights the importance of recognizing livelihood dependence when evaluating mining governance. Community participants do not present mining as a choice between economic development and environmental protection. Instead, mining is described as a continuing source of employment and household income operating alongside concerns regarding environmental degradation, unequal opportunities and future livelihood security. This coexistence of dependence and concern reveals the complexity of governance decisions in long-established mining communities. It also suggests that governance reforms are unlikely to succeed if they address environmental protection or economic development independently. More durable governance outcomes are likely to depend upon approaches capable of balancing livelihood security, environmental stewardship and equitable participation within the same governance framework.

The final governance dimension concerns institutional coordination. Throughout the findings, governance responsibilities are distributed across multiple agencies and organizations operating at different administrative levels. Rather than identifying institutional fragmentation simply as an administrative weakness, the evidence suggests that governance outcomes are influenced by the way responsibilities, regulatory mandates and implementation processes interact across these institutions. For instance, participation, environmental management, ASM formalization and benefit-sharing are not implemented independently but through institutional relationships that require coordination across government agencies, local authorities, Indigenous institutions and mining operators. Understanding these interactions therefore becomes essential for explaining why governance arrangements may be experienced differently by different stakeholder groups despite operating within the same regulatory framework.

5.3. Political ecology as an explanatory framework

The governance dynamics identified above illustrate why political ecology provides a valuable framework for interpreting mining governance in Itogon. Authority over mining activities is distributed through legal mandates, regulatory responsibilities and administrative processes, yet stakeholders experience these arrangements differently according to their institutional roles and social positions. Government agencies, mining companies, IP representatives and local communities therefore evaluate governance from different institutional locations, resulting in contrasting assessments of participation, environmental management and governance effectiveness. The evidence suggests that these differences are not solely the product of conflicting interests but also reflect the multiple ways in which governance is experienced across the mining sector.

Political ecology also provides a useful perspective for understanding access within mining governance. The findings indicate that access extends beyond the formal recognition of legal rights or regulatory mechanisms. Practical participation in governance depends upon institutional capacity, administrative requirements, technical knowledge and financial resources that enable stakeholders to engage effectively with formal governance arrangements. This interpretation broadens the concept of access from one of legal entitlement to one that also considers the institutional conditions that shape the ability of different actors to benefit from governance mechanisms. The experiences surrounding *Minahang Bayan* illustrate this distinction particularly clearly, where the existence of formal pathways to legalization does not necessarily ensure equitable opportunities for participation.

The environmental findings further demonstrate that environmental governance cannot be understood exclusively through regulatory compliance. Political ecology encourages attention to how environmental change is experienced by different actors and how these experiences influence perceptions of governance. The interviews indicate that environmental performance is assessed through both institutional measures, such as monitoring and rehabilitation, and community experiences of watershed condition, environmental degradation and livelihood security. These perspectives illustrate complementary dimensions of environmental governance that provide a more comprehensive understanding of environmental performance. The concept of hazardscapes contributes to this interpretation by helping explain how environmental risks become socially experienced within mining landscapes. The findings do not suggest that hazardscapes constitute a separate governance dimension. Instead, they indicate that environmental risks are understood through the interaction of ecological conditions, institutional responses and community experience.

5.4. Contribution to mining governance scholarship

The integrated interpretation developed above contributes to mining governance scholarship in several important ways. First, it demonstrates the value of examining governance mechanisms as components of a broader governance system rather than as isolated institutional instruments. Much of the existing literature has provided important insights into individual aspects of mining governance, including Indigenous participation through FPIC, corporate social responsibility and community development

through SDMP, or the regulation of ASM through *Minahang Bayan*. The present study suggests that these mechanisms are most appropriately understood as interdependent components whose effectiveness depends on their interaction within a wider institutional context.

Second, the findings contribute to a more nuanced understanding of governance effectiveness. Rather than evaluating governance solely according to regulatory compliance or policy design, the study demonstrates that governance is experienced differently by actors occupying different institutional positions. This distinction highlights that assessments of governance cannot be separated from the perspectives through which governance is observed. Government institutions, mining companies, Indigenous representatives and local communities evaluate governance using different but equally legitimate criteria derived from their respective responsibilities, experiences and expectations. Recognizing these multiple perspectives provides a more comprehensive understanding of governance performance than approaches that privilege a single institutional viewpoint.

A further contribution concerns the relationship between formal governance arrangements and their practical implementation. The findings indicate that governance outcomes are influenced not only by the existence of regulatory mechanisms but also by the institutional conditions under which they operate. Participation, access to formal mining arrangements, environmental management and benefit-sharing are shaped by administrative capacity, institutional coordination and stakeholder interactions that extend beyond the design of individual governance instruments. This interpretation contributes to a growing recognition that governance effectiveness depends as much on institutional relationships and implementation processes as on formal regulatory provisions.

The study also contributes to qualitative mining governance research by demonstrating the value of analyzing convergence and divergence across stakeholder perspectives. Contrasting views are not competing accounts of the same governance system. On the contrary, they reveal how governance operates in practice. Areas of agreement identify shared governance objectives, while areas of divergence provide important insights into the institutional, social and environmental conditions through which governance is experienced. Examining these perspectives strengthens understanding of governance complexity rather than simply documenting stakeholder agreements or disagreement.

5.5. Key policy directions for strengthening mining governance

The governance dynamics identified in this study indicate a set of complementary policy directions that recognize the interconnected nature of mining governance. Because participation, access, environmental governance, benefit-sharing and institutional coordination influence one another, future efforts to strengthen mining governance are likely to be more effective when these dimensions are considered as mutually reinforcing components of the broader governance system rather than as isolated governance mechanisms.

A first policy direction concerns institutional coordination. Governance responsibilities are distributed across multiple national agencies, local governments, Indigenous institutions and mining actors, each operating under distinct legal mandates and administrative responsibilities. While this institutional diversity provides specialized oversight, the findings indicate that governance outcomes are shaped by the effectiveness of coordination across these organizations. Future governance efforts would therefore benefit from greater attention to strengthening institutional coherence, improving communication across governance levels, and promoting more integrated implementation of existing regulatory and participatory mechanisms.

A second policy direction concerns the quality of participation within mining governance. The analysis indicates that governance legitimacy depends not only on the existence of participatory procedures but also on how those processes are experienced by affected stakeholders. Future governance efforts would therefore need to strengthen the substantive quality of participation by creating opportunities for meaningful dialogue, transparent decision-making and continued engagement throughout the governance process. Stakeholder confidence in governance is influenced as much by the perceived quality of participation as by procedural compliance.

The findings also point towards the importance of improving practical access to formal governance arrangements for ASM. Participants consistently recognized the value of formalization while identifying financial, technical and administrative barriers that constrain effective participation. Future governance efforts require approaches that improve the accessibility of existing formalization mechanisms while maintaining appropriate environmental and regulatory standards. Addressing implementation barriers identified by stakeholders may contribute to more inclusive governance without altering the broader regulatory objectives of the mining framework.

Environmental governance represents a further policy direction emerging from the analysis. The findings demonstrate that environmental performance is evaluated through both regulatory oversight and community experience. Strengthening environmental governance would therefore benefit from approaches that recognize the complementary value of institutional monitoring and locally grounded knowledge. Integrating these perspectives may strengthen the capacity of governance institutions to respond to environmental concerns while improving transparency and confidence in related management processes.

The analysis further indicates that benefit-sharing should be considered as an integral component of governance rather than solely as an outcome of mining activity. Participants acknowledged the contribution of mining to employment, infrastructure and community development while raising questions regarding the distribution, accessibility and long-term sustainability of these benefits. Future governance efforts would therefore require continued attention to transparency, accountability and locally responsive implementation of benefit-sharing mechanisms, along with support for livelihood opportunities capable of strengthening long-term community resilience.

These policy directions reinforce the central conclusion of this study: strengthening mining governance is unlikely to depend upon modifications to individual governance mechanisms alone. Instead, the findings indicate that durable improvements are more likely to emerge through governance approaches that recognize the interdependence of institutional coordination, meaningful participation, equitable access, environmental stewardship and inclusive benefit-sharing. These directions do not prescribe specific institutional reforms but identify priorities that emerge directly from the governance dynamics revealed by the empirical evidence and that may inform future policy development, implementation and research on mining governance in the Philippines.

6. Limitations and future research

This study should be interpreted within the scope of its research design. As a qualitative case study of mining governance in the municipality of Itogon, Benguet, its findings are grounded in a specific institutional, social and environmental context. It offers an in-depth examination of governance processes, institutional relationships and stakeholder experiences that contributes to the analytical understanding of mining governance and provides a basis for comparison with other mining contexts. It is not intended to provide generalizations to other mining regions in the Philippines or elsewhere.

The qualitative approach adopted in this study was appropriate for examining how governance mechanisms are experienced, interpreted and negotiated by the institutions, organizations and communities directly involved in mining. It also enabled a detailed examination of the governance dynamics that emerge through stakeholder interactions and institutional practice. The analysis of participation, access, environmental governance, benefit-sharing and institutional coordination constitutes the principal contribution of the study and illustrates the type of understanding that qualitative research can provide beyond what quantitative indicators alone are able to capture.

A limitation is that the views of the participants in the study should not be interpreted as independently verified findings regarding the compliance or performance of any specific mining company. Where stakeholder perceptions differ from those of industry representatives or government agencies, these differences are examined as part of the broader governance dynamics explored in this study.

Future research could build upon these findings in several ways. Comparative studies across different mining regions would help examine whether the governance dynamics identified in Itogon are also evident under different institutional arrangements, socio-environmental conditions and mining systems. Longitudinal research could further explore how these governance dynamics evolve over time in response to policy reforms, institutional change and shifting community priorities. In addition, mixed-methods research combining qualitative analysis with quantitative indicators of governance performance, environmental change and socio-economic outcomes would complement the present findings and provide a more comprehensive understanding of mining governance across different contexts.

These research directions do not diminish the contribution of the present study. They highlight the opportunities for extending and testing the analytical insights developed here. By identifying the governance dynamics through which mining governance operates in practice, this study provides a foundation for future research seeking to better understand the relationships between governance institutions, stakeholder experiences and sustainable mineral development.

7. Conclusions

This study examined how key mining governance mechanisms are experienced and perceived by diverse stakeholders in the municipality of Itogon, Benguet. By integrating perspectives from government agencies, mining companies, IP representatives, local governments, community leaders and ASM stakeholders, the study moved beyond the examination of individual governance mechanisms to provide an integrated understanding of how mining governance operates in practice.

The findings demonstrate that mining governance cannot be adequately understood by considering mechanisms such as FPIC, SDMP, or *Minahang Bayan* in isolation. Governance emerges through the interaction of institutional responsibilities, stakeholder participation, access to formal governance arrangements, environmental management, benefit-sharing and institutional coordination. Examining these relationships provides a more comprehensive explanation of governance outcomes than approaches that focus primarily on individual policies or regulatory instruments.

Interpreting these governance dynamics through a political ecology perspective further demonstrates that governance outcomes are shaped not only by formal institutional arrangements but also by the ways in which different actors experience, negotiate and evaluate governance processes. This perspective contributes to a more nuanced understanding of mining governance by showing that differences in stakeholder perspectives are not simply expressions of competing interests but reflections of the different institutional roles, responsibilities and lived experiences through which governance is implemented and experienced.

The study therefore contributes to mining governance scholarship by demonstrating the value of analyzing governance as an interconnected institutional system rather than as a collection of discrete governance mechanisms. This approach provides a stronger basis for understanding how governance arrangements influence environmental stewardship, community participation, livelihood opportunities and institutional legitimacy, while also offering a framework for interpreting the complex relationships among these dimensions in practice.

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Data availability statement

The data that support the findings of this study are available upon reasonable request from the authors.

Supplementary data 1 available at : <https://doi.org/10.1088/2515-7620/ae9257/data1>.

Supplementary data 2 available at : <https://doi.org/10.1088/2515-7620/ae9257/data2>.

Ethics statement

This study received ethical approval from the ethics committee of the College of Social Sciences, University of Glasgow, Approval No. 4002 200 194. All participants were informed about the purpose of the study and written (or informed) consent was obtained prior to participation. Participation was voluntary, and participants could withdraw at any time without consequence. All data were pseudonymised and handled confidentially throughout the research.

Author contributions

Cecilia Tortajada  [0000-0001-6308-4924](#)

Conceptualization (equal), Investigation (equal), Methodology (equal), Writing – original draft (lead), Writing – review & editing (equal)

Justine Perry T Domingo  [0000-0002-9746-4930](#)

Conceptualization (equal), Investigation (equal), Methodology (equal), Visualization (equal), Writing – review & editing (equal)

Richard Williams  [0000-0001-6067-1947](#)

Conceptualization (equal), Funding acquisition (equal), Investigation (equal), Methodology (equal), Project administration (equal), Visualization (equal), Writing – review & editing (equal)

Karen A Hudson-Edwards  [0000-0003-3965-2658](#)

Writing – review & editing (equal)

Antonio P Contreras  [0009-0007-2023-7338](#)

Conceptualization (equal), Investigation (equal), Methodology (equal), Writing – review & editing (equal)

Decibel V Faustino-Eslava  [0000-0002-1484-0452](#)

Conceptualization (equal), Funding acquisition (equal), Investigation (equal), Methodology (equal), Project administration (equal), Supervision (equal), Writing – review & editing (equal)

Evaristo Niño T Cando  [0000-0001-8782-5424](#)

Conceptualization (equal), Investigation (equal), Methodology (equal)

Danesto B Anacio  [0000-0002-6156-7196](#)

Investigation (equal), Methodology (equal)

Thaddeus P Lawas  [0009-0008-9558-4294](#)

Investigation (equal), Methodology (equal)

Loucel E Cui  [0000-0003-1153-6006](#)

Investigation (equal), Methodology (equal)

Juan Miguel R Guotana  [0000-0003-3582-1952](#)

Investigation (equal), Methodology (equal)

Jenielyn T Padrones  [0000-0002-4944-9533](#)

Investigation (equal), Methodology (equal)

Rosemarie Laila D Areglado  [0000-0002-6838-4819](#)

Investigation (equal), Methodology (equal)

Ma Ericha M Amante  [0009-0008-2170-8194](#)

Investigation (equal), Methodology (equal)

Kit Felian C Tenio  [0000-0003-1747-1725](#)

Investigation (equal), Methodology (equal)

Francis Ian Gonzalvo  [0009-0002-9038-2016](#)

Investigation (equal), Methodology (equal)

Manilyn Casa  [0009-0007-8279-8499](#)

Investigation (equal)

Earvin Jon Guevarra  [0009-0003-3757-522X](#)

Investigation (equal)

Dhannielle Grace P Bernardo  [0009-0007-8913-8573](#)

Investigation (equal)

Kim Bryan N Cabrera  [0009-0001-3456-0343](#)

Investigation (equal)

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