

## **Does formalization make a difference in artisanal and small-scale gold mining (ASGM)? Insights from the Philippines.**

Maria Eugenia Robles Mengoa, Boris Verbrugge & Sara Geenen

Policy-makers have looked at formalization as a critical step towards resolving the social and environmental challenges associated with informal gold mining. In contrast with informal gold mines, formal mines are believed to minimize miners' negative impact on the environment, and to offer better working conditions. Based on a combination of quantitative and qualitative data gathered in Agusan del Sur, Philippines, we argue that this overly optimistic view conceals how, at least in the domain of working conditions, formal mining may replicate rather than alleviate some of the challenges typically associated with informal mining. In the Philippines, formalization seemingly fails to address some of the structural disadvantages facing workers at the lower end of the labour hierarchy. At the same time, we find that workers do have a clear preference for non-standardized forms of remuneration. Based on these observations, we argue (1) that formalization efforts need to take into account the needs and preferences of those involved; and (2) that these preferences do not always align with mainstream notions of decent work.

**Keywords:** Artisanal and small-scale mining, formalization, informal economy, decent work, Philippines.

### **1. Introduction**

Across the globe, people can be found panning, digging, and diving for gold. Artisanal and small-scale gold mining (ASGM) is estimated to contribute up to one-fifth of global gold production (IGF, 2018: 3) and employs at least 16 million people (Seccatore et al., 2014: 666). The dramatic expansion of what is commonly defined as low-tech and labour-intensive gold mining is often explained as a product of (agricultural) poverty, which is pushing people into the mines (Hilson and Garforth, 2013; Hilson and Van Bockstael, 2012; Siegel and Veiga, 2009). However, it is equally important to note that the expansion of ASGM plays a vital role in the global gold production system by addressing systemic challenges facing the gold mining industry – notably rising scarcity, costs, and resistance (Verbrugge and Geenen, 2020a).

One of the most salient features of ASGM is persistent informality. Some estimates suggest that up to 70 or even 80% of ASGM operates without government recognition (IGF, 2017). Informality is commonly considered to lie at the root of a wide range of social and environmental challenges, ranging from exploitative labour arrangements and child labour to deforestation, soil erosion, and heavy metals pollution. To address these challenges, donors and international organizations have been pressuring governments into formalizing ASGM for more than two decades (Siegel and Veiga, 2009).

By the late 2000s, a consensus started to emerge that formalization efforts were failing (Hilson and Maconachie, 2017). Scholars set out to explain this failure, referring to fiscal and administrative

barriers that prevent easy formalization, processes of elite capture, and the monopolization of mineralized lands by industrial mining. Yet, in recent years, countries such as Tanzania (Pedersen et al., 2019) and Peru (Salas-Urviola et al., 2021; Wiener Ramos, 2019) have made unexpected (and admittedly modest) progress in formalizing ASGM. To date, however, there is limited evidence on the actual impact that these formalization efforts are having on different categories of miners. Clearly, to the extent that formalization focuses on the recognition of mineral property rights (e.g. in the form of mining licences or permits), it can be advantageous for those wielding these rights (Clausen and Barreto, 2011). However, critical questions have been raised regarding the extent to which formalization efforts improve the situation of workers (Verbrugge and Besmanos, 2016). Despite recent attempts at painting a more heterogeneous picture of the workforce in ASGM (Ferring et al., 2016), including survey data on workers' earnings (Geenen et al., 2020; Radley, 2020), systematic data on how these earnings and working conditions are affected by formalization remains remarkably scarce.

In the second section of the article, we present a summary overview of existing research on formalization dynamics in ASGM. In section three, we provide contextual information about ASGM in the Philippines. Next, we introduce our two research sites and explain the methods used. In section six, we present our empirical findings based on three major themes: the composition of the workforce, payment systems, and health and safety. Finally, we discuss the broader implications of our findings.

## 2. Formalization: what we (do not) know

As indicated above, a lot of research has tried to account for the persistence of informality in the face of (seemingly) unrelenting efforts on the part of host governments to formalize ASGM. Explanations commonly refer to the overly complex nature of formalization processes. Research from countries such as Peru (Cortés-McPherson, 2019; Salo et al., 2016), Colombia (Veiga and Fadina, 2020), Liberia (Van Bockstael, 2014), DR Congo (Geenen, 2012), and Ghana (Hilson et al., 2018) has extensively documented how various fiscal and administrative barriers prevent the easy formalization of small operators with limited resources and a limited understanding of bureaucratic procedures. The few actors that are able to navigate their way through the formalization process are typically those with financial capital and political connections (De Haan and Geenen, 2016; Hook, 2019; Pedersen et al., 2019; Verbrugge, 2014).

Another set of causal explanations for persistent informality refers to the unrelenting expansion of industrial gold mining. Since the 1980s, the gold mining industry has moved from its traditional core (North America, South Africa, Russia, Australia) into a wide range of new 'gold mining destinations' – precisely those countries and regions with a significant presence of ASGM (Verbrugge and Geenen, 2020a). As part of structural reforms promoted by international financial institutions such as the International Monetary Fund (IMF) and the World Bank, many countries actively welcomed foreign direct investment (FDI) in their nascent mining industries (Bridge, 2004). On the ground, this influx of FDI led to a notable expansion of industrial mining concessions. In many countries, then, the formalization of ASGM was a 'legislative afterthought', introduced long after mining companies had monopolized access to mineral-bearing land (Banchirigah and Hilson, 2009).

More broadly, the failure of formalization policies has been related to the broader assumptions underpinning them and to how these feed into particular policy practices. Formalization efforts have long relied on a top-down, command-and-control approach, which not only disregards miners' lack of

incentives to formalize but may even result in the criminalization of ASGM miners (Prescott et al., 2020). In some cases, formalization has been paired with the (violent) repression of informal ASGM, for example in Peru (Damonte, 2016), Colombia (Ramírez Guerrero, 2012; Tubb, 2020), or DR Congo (Geenen, 2012).

As noted in the introduction, a growing number of countries are now making headway in their efforts to formalize ASGM. However, critical research has revealed that the reach of these formalization efforts is highly uneven, both between and within countries. One example is Peru: while government efforts to formalize ASGM are gradually bearing fruit in Andean mining regions, ASGM in the Amazonian floodplains remains largely informal (Hopkins Barriga et al., 2020; Salas-Urviola et al., 2021). And, as discussed in the preceding section, ongoing formalization efforts tend to focus primarily on medium-scale miners with sufficient capital and political knowhow, to the detriment of truly artisanal and small-scale operators (e.g. Pedersen et al., 2019).

Arguably even more important is the observation that formalization may differentially affect those involved in ASGM. More precisely, it has been observed that formalization policies focus one-sidedly on mineral property rights (i.e. on the issuance of mining permits, licences, and titles), while disregarding labour issues (Verbrugge and Besmanos, 2016). Almost a decade ago, Fold et al. (2013) noted that formalization programmes do not directly engage with labour issues, except when they target mercury use and thus aim to protect workers. In 2013, the Minamata Convention was signed, which requires signatories to reduce or eliminate the use of mercury in ASGM<sup>1</sup>. As formalization is seen to be a crucial precondition, many countries have recently included steps towards ASGM formalization in their National Action Plans (Hilson et al., 2018). Progress is also being made in the field of health and safety, with the World Bank's and Pact's Delve initiative declaring the year 2021 'the year of occupational health and safety around the world' (World Bank, 2020). Yet, despite this progress, informality is still widespread. It persists even in purportedly formalized ASGM, which may have far-reaching consequences for those involved (see Salman et al., 2015, for the case of Bolivian miners' cooperatives, and Hilson et al., 2016, for the case of Fairtrade Gold).

### 3. ASGM in the political economy of mining

#### 3.2. The political economy of mining

While Spanish colonial efforts to gain control over the country's mineral resources were largely unsuccessful, from the US colonial period onwards ruling elites have supported the expansion of the mining frontier into increasingly remote corners of the archipelago. Following the end of the Marcos dictatorship, the new democratic regime adopted neoliberal reforms that were meant to revamp a fledgling mining industry, by promoting foreign investments (Singh & Camba, 2020). While successive national governments have largely adhered to this model, some did so half-heartedly. Notably, the government of Benigno 'Noy' Aquino (2010-2016) introduced a series of reforms that were meant to increase the transparency and sustainability of the mining industry (Ibid.). The Duterte government's (2016-present) stance vis-à-vis the mining industry is marked by ambiguity: while the

---

<sup>1</sup> The Philippines signed the Minamata convention in 2013. The mercury treaty entered into force in 2017 and it has been ratified by the Philippines government in July 8<sup>th</sup> 2020. Efforts to regulate the use of mercury in the country have been enforced since 1997 with a chemical control order (CCO). In 2019 the Department of Environment and Natural Resources adjusted the CCO in alignment with the Minamata convention. Since the Philippines does not hold a domestic law against contamination, the Minamata convention becomes a crucial legal framework to control toxic metals such as mercury. According to BAN toxics, mercury in the Philippines is sourced from neighbouring countries (China and Malaysia) and enters through the region of Mindanao. Its use is high in ASGM communities because of how easily accessible it is to miners. (BAN Toxics, 2019)

president has repeatedly spoken out against ‘environmentally destructive mining’, there have been no visible signs of ‘deepening reforms in favor of pro-poor mining policy’ (Camba, 2020: 248). Only recently, the president has overturned a mining moratorium that was instated by Aquino in 2012, effectively enabling the opening of new mines across the country (Garcia, 2021).

This political ambiguity vis-à-vis the mining industry, which was already apparent in preceding administrations, can partly be explained by widespread anti-mining sentiments across the country (Holden, Nadeau, & Jacobsen, 2011). Moreover, national mining policies do not exist in a vacuum. Instead, as will be demonstrated below, they co-exist and intersect with a wide range of other policy frameworks, both at the national and at the local level. This ‘institutional ambiguity’ (Verbrugge, 2015a) has effectively hampered a further expansion of the mining industry throughout the country. In short, rather than simply a top-down imposition of a neoliberal mining regime, the image that emerges from this short overview is one of policy ambiguity and -fragmentation.

### 3.2. ASGM

Since the 1980s, ASGM has witnessed a spectacular expansion across the Philippines, particularly on the islands of Mindanao and Luzon. Estimates suggest that up to 500,000 people may be involved in the sector, with many more depending on ancillary activities (EITI, 2015). This expansion is the result of a combination of factors, including a downturn in industrial mining (which created a semi-skilled pool of jobless workers), rural poverty, rising gold prices, and the gradual involvement of local elites willing to invest in ASGM (Verbrugge, 2014).

In line with national-level efforts to promote industrial mining, national governments have undertaken efforts to increase control over ASGM.<sup>2</sup> In 1984, dictator Ferdinand Marcos promulgated presidential decree No. 1899, a highly permissive system for the issuance of permits to individual ASGM operators which at the same time sought to direct ASGM revenues into the coffers of the Philippine state. In 1991, congress enacted Republic Act (RA) No. 7076 (the ‘People’s Small-Scale Mining Act’), which put in place more stringent requirements for ASGM. It also created mining regulatory boards at the level of provinces and cities, which were authorized to designate ‘people’s small-scale mining areas’ (*Minahang Bayan*). Petitioners for *Minahang Bayan* areas can be individuals, mining associations or cooperatives, or local government units (Pascual et al., 2019: 38). Both PD 1899 and RA 7076 define small-scale mining as ‘artisanal with heavy reliance on manual labour and without the use of explosives and/or blasting accessories (...) [it is] prohibited from using sophisticated and/or heavy equipment’ (DENR, 2007).

Despite the Philippine state’s efforts to regulate and formalize ASGM, informality persists. Most gold is traded through clandestine networks dominated by Chinese traders, even though the central bank holds a monopoly on gold-buying (Francisco, 2012). When the government imposed a new tax on gold sales in 2011, official gold sales dropped by a whopping 99%. While the government removed these taxes in 2019, it remains to be seen whether it will eventually succeed in recovering some of the gold that was lost to the black market (Miraflor, 2020).

Zooming in on the current formalization process, the situation in the Philippines is quite similar to that in many other countries: a range of administrative requirements prevent ASGM operators from acquiring a permit or contract. Examples include notarized application forms, survey plans prepared by a land surveyor, a surety bond, a technical evaluation report from the Mines and Geosciences Bureau (MGB), Environmental Compliance Certificates from the Department of Environment and

---

<sup>2</sup> All relevant laws and regulations can be consulted on the website of the Mines and Geosciences Bureau: [www.mgb.gov.ph](http://www.mgb.gov.ph).

Natural Resources, business permits and zoning certifications issued by local governments, a mining plan prepared by an engineer, and proofs of financial and technical capability issued by a financial institution. These administrative requirements carry significant costs, which can be further inflated by corrupt government officials (Verbrugge, 2015a).

More broadly, it is important to note that formalization policies intersect with other policy frameworks for the mining industry, and for land use more broadly (e.g. forestry, Indigenous rights, nature conservation). On the ground, this can lead to overlapping claims and may even give rise to conflicts (Verbrugge, 2015a). Most notably, permits for the large-scale exploration or exploitation of mineral resources have been issued for large swathes of the country. Because a *Minahang Bayan* can be created only inside these concessions, with the explicit consent of the rights-wielding company, the amount of land available to formal ASGM is severely constricted (Verbrugge, 2015a). In several areas, this has already given rise to intense conflicts between ASGM and large mining companies.

Notwithstanding these obstacles to formalizing ASGM, in recent years the Philippine government has stepped up by fast-tracking several applications for *Minahang Bayan*. As of May 2020, 39 *Minahang Bayan* were operating had been designated across the country, up from 20 in 2018 (Ocampo, 2021). According to the Department of Environment and Natural Resources, one of the key reasons for this renewed formalization push is that it can rejuvenate the sector and generate more jobs at a time of heightened economic uncertainty due to the COVID-19 pandemic (Ocampo, 2021).

Despite this renewed push for formalization, most ASGM across the Philippines continues without national government recognition. As frustration about this situation has continued to grow, local government officials across the country have turned a blind eye, or have even gone further, handing out business permits and other forms of licenses to purportedly ‘illegal’ mining operations. As a result of this bottom-up process of formalization, even in the absence of effective formalization policies, many ASGM-operations now operate with at least a semblance of legality (Verbrugge, 2015a).

## 4. Research sites

In this paper, we focus on two mining areas. The first is a ‘mining association’ operating with a legal permit (to which we simply refer to as MALP – mining association operating with a legal permit). Because of its legal status, this mining area is considered as ‘formal’ within the Philippines government's legal framework. Second, we studied an ASGM area that does not operate with a legal permit (to which we will refer to as NOLP – not operating with a legal permit). Consequently, it is considered as ‘informal’ by the Philippines government’s legal framework. Although the findings of this study depict a blurry division between what is considered formal and informal, the legal categorization (‘formal’ for MALP and ‘informal’ for NOLP) is used in some sections of this article for comparison reasons. Both mining areas are located in the province of Agusan del Sur, on the southern island of Mindanao.

### 4.1 MALP

In 1987, a group of small-scale miners who had been mining in *Barangay* (smallest administrative unit) ‘B’ since the 1970s created MALP. This enabled them to apply for *Minahang Bayan*. MALP negotiated an agreement with the leaders of the indigenous groups in whose ancestral domain the mine is situated, offering them a 1.5% share in production (paid in sacks of ore). However, the official permit was only granted in November 2012, a result of the onerous bureaucracy. MALP is showcased as a successful formalized mine in the Philippines. Its representatives have been invited at several events to present their best practices, which include a ban on logging, the reforestation of landslide-prone areas, a ban on mercury use and ore processing within the *Minahang Bayan*, training for workers, and

the use of tunnel safety structures and safety equipment for all workers. Although the company is registered as a miners' association, one financier owns all MALP tunnels – there are 52 active tunnels and a large number of inactive ones. This person has not only invested in mining but also in other activities (mostly agriculture-related), and he has given powerful positions to his kin and clients. According to MALP's president, all workers are paid a salary, and on top of that they will receive a share in the production. This share is based on a 70-30 scheme, whereby 30% is distributed amongst workers and staff and 70% goes to the financier.

#### 4.2. NOLP

NOLP is located in a small community in *Barangay* Santa Cruz. It is one of the many ASGM operations inside the ancestral domain of the Manobo Tribes of Rosario. Mining operations in this area started in the late 1940s. According to respondents, they were undertaken by an American mining company up until the 1980s. Once the company left, some of its ex-workers and locals continued mining as artisanal and small-scale miners. By the late 1980s, workers operating in the area established the a small scale miners association. In 2006, this association applied for the registration and formalization of its mining operations, but burdensome bureaucracy is again slowing down the process. In 2019, the Manobo tribal leaders consented to a mineral agreement in the form of a joint venture agreement<sup>3</sup> with a former shareholder of the Philsaga Mining Corporation (PSMC), one of the largest mining companies in the Philippines. The agreement gives the PSMC shareholder the right to mine, whilst contributing 1.5% of mining royalties to the Manobo tribes. After the miners' association, having itself applied for a permit more than 10 years ago, expressed its dissatisfaction, PSMC ceded a concession of 40 hectares to them. However, this concession contained less gold than expected, which triggered new negotiations in the course of 2020. Eventually, a new area of 40 hectares was delineated for the association, where they are expected to start working by the end of 2021.

### 5. Methods

Qualitative and quantitative data were gathered during a ten-week stay in the Philippines (May–July 2019). We carried out a survey composed of 121 structured and open questions with the help of six local enumerators. The total sample size was 601, spread over three mining areas in the provinces of Agusan del Sur (201 surveys), South Cotabato (199 surveys), and Davao de Oro (201 surveys). For this article, we used the data from the surveys in the province of Agusan del Sur: 114 from MALP and 87 from NOLP. There are no data on the total population as miners in informal mines are not registered, and their number heavily fluctuates with variations in production, material and financial constraints, and seasons. We combined quota and convenience sampling techniques to make sure different jobs were represented in the survey. Hence, 80% of our respondents were sampled among the laborers at the 'low end' of the labour hierarchy, doing a variety of less remunerated jobs. On the site, we had to adjust to the circumstances and invite people who were available to participate in the survey. The survey data was analysed using R and SPSS.

Qualitative data was gathered through in-depth interviews (33 in total), participant observation (inside and outside tunnels, as well as in the surrounding villages), informal conversations, audio-visual data and documents. We sampled key actors such as local authorities (representatives of the MGB and tribal

---

<sup>3</sup> 'A Joint Venture Agreement is an agreement under which the Philippine government and the contractor organize a joint venture company in which both parties have equity. The Philippine government takes a share from equity earnings as well as from the gross output of the mining operation.' (Quisumbing Torres, 2005:4)



leaders), financiers, gold shop owners, male and female miners, members from surrounding communities, and professional experts in the field of ASGM in the Philippines.

In addition to explicitly seeking the informed consent of all respondents (orally or in writing, depending on the circumstances), we also filed a formal request for permission from the local tribal authority, the local miners' association, and the president of MALP. Respondents' names were pseudonymized using codes.

The research has two major limitations. First, miners are hesitant to disclose information on incomes and volumes because of the informality as well as the unpredictability of gold mining. As a result, our data on incomes and production volumes are not robust. Second, there are limitations to the sampling. As we explained, we combined quota and convenience sampling since a random sampling would be extremely time consuming and expensive, and would probably raise suspicion in this context. There is also an important group of gold-processing-plant workers who were not considered in the survey. In the case of NOLP, ball mill owners and workers declined the invitation to participate, supposedly because of the illegality of their activities, including the use of mercury. In the case of MALP, a visit to their carbon-in-pulp (CIP) cyanide processing plant was denied.

As a disclaimer, it should be noted that although this research relies only to the two case studies presented in Agusan del Sur, the political dynamics of ASGM are similar in other mining areas of the Philippines. Whereas there are specifiers that make each mining area a distinct space, we believe that these do not undermine the validity of our research.

## 6. Results

### 6.1. Composition of the workforce

First of all, it is important to provide a more detailed description of the workforce in order to understand how different categories of workers might be affected in different ways. It should be noted once again that the composition of the workforce varies in terms of type of operation (underground tunnels versus gold panning and sluicing), geographical area, and sometimes the season. The description below is based on underground mining and serves to illustrate our analytical point about the differentiated impact of formalization.

In informal mining, the landowner holds the rights and/or access to the land. In some cases, the landowner is an Indigenous community, represented by its tribal leader(s) or individuals known as land claimants. Underground tunnel owners can be locals or migrants. In some cases, the tunnel owner is an association of small-scale miners or a cooperative, in others, it can be a financier. When this is not the case, the tunnel owner depends on a financier to start operating. A financier is an individual who possesses the means to operate the tunnel. He invests in materials and technology to dig the tunnel (machinery and supplies) and in workers. Once a tunnel starts producing, the largest share of the output goes to the financier and tunnel owner (60% to 70% of total production). Underground, the work is managed by an operations manager or team leader, a person who usually has extensive experience in mining. Depending on the context, this person can be a technician, engineer, or high-skilled *abantero* (see below). Usually, this is a male worker and someone a financier trusts. He is also tasked with transporting the ores to the processing plants. Security and safety workers are in charge of guarding the entrance to the tunnels, making sure there are no robberies or assaults, and monitoring and counting ore sacks. Then, there are several experts: workers with specific skills who accomplish specific tasks. They are called upon when needed.

The 'underground' workforce is composed of *abanteros* and *atraseros*. *Abanteros* are generally miners with experience in different stages of the mining process. They are in charge of digging and extracting mineral rocks. Those with more experience are considered to be high-skilled. Their knowledge is useful for the prospecting phase because of their expertise in identifying gold deposits and veins. *Atraseros* are ore packers and haulers. Both *abanteros* and *atraseros* get a smaller share of the output, as will be detailed later. In each tunnel there is also a cook in charge of preparing meals for all the workers. Cooks can be women or men, depending on the situation and availability of workers. In some cases, when the work is not very intensive, workers from a team will take turns to cook. When the work is heavy and more efforts are required, someone from outside of the team will be hired temporarily to cook for the workers. Cooking is done inside the household of the cook or in a provisional bunkhouse outside the tunnel. Finally, there are stone washers. These are women, wives of miners, widows, or single mothers who get the ore muck to wash in the river. In NOLP, the main tasks of stone washers are rock crushing and panning. Depending on the content of the ore muck, they will either crush stones that are solid or sieve the fine 'mud' that is found inside ore sacks. Finally, they will use panners to catch gold particles with a circular movement. This activity is also done by young men, who are usually the children of these women. For many of these boys, stone washing is their first introduction to mining activity. Once stone washers have recovered the gold in small – nearly imperceptible – pieces, they will bring it to the ball mills, where they pay a fee for its processing. The panning skills of stone washers are an asset in the ball mills, where they sometimes get hired to work in the final processing stage, where they separate water from mercury inside a basin.

Gold processing in informal mining is done at the ball mills, located close to the mining area and rivers, in order to facilitate water provision. Positions at a ball mill include *cargador* (ore sack hoarder), rock crusher, ball mill operator, and mercury processor (and sometimes stone washer). In some cases, ball mills are businesses managed by entire families, involving wife and children in the processing tasks. In other cases, they are owned by financiers who take more benefit from the earnings of their tunnel production because they can process their ore muck in different rounds. When that is not the case, financiers can negotiate with ball mill owners to divide the earnings of multiple processing rounds. The remnants of these processed ores are called tailings.<sup>4</sup> An important volume of gold is concentrated in these tailings, which ball mill owners accumulate and sell to CIP cyanide plants for a final processing that will recover the gold almost entirely.

In our case of formal mining, the head of MALP is considered the owner of all tunnels. As the main financier he receives the largest share of the production. However, he was rarely present in the mining area. The coordination and supervision of mining operations were delegated to MALP's miners' association's president and the office staff. The president is considered the right hand of MALP's main financier and supervised the mine's operation. At the time of our research, this position was occupied by MALP's main financier's nephew. The managerial staff was composed by engineers, geologists and a supervisor in charge of tunnels monitoring. The administrator of MALP (in this case the wife of MALP's miners' association's president) is in charge of managing the company's budget, salary payments, and other administrative tasks. Just like in informal mines, there were security and safety workers, but here they were more numerous including a safety officer, portal guard, warehouse supervisor, and electrical maintenance. At the tunnel entrance, for instance, there was a portal guard

---

<sup>4</sup> Tailings are the remnants of the processed ores, which appear to be mud. Tailings are accumulated and stored in tanks.

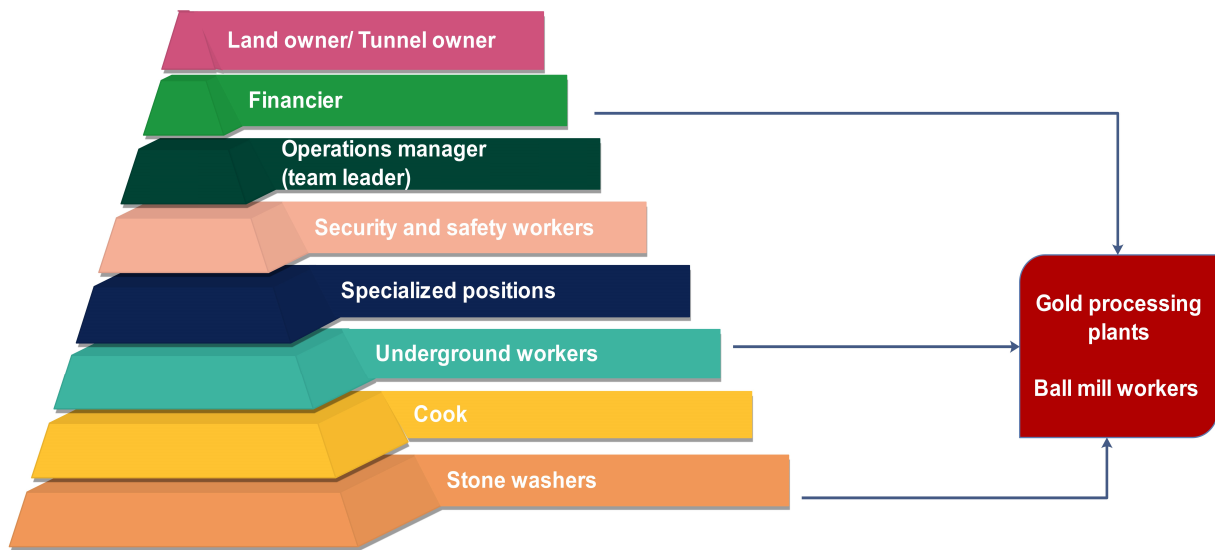


registering workers' entrance, making sure that everyone had a safety equipment, and monitoring mineral-stealing by workers. Other workers may assist with electric maintenance, fix roof structures or ventilation systems in the tunnels. Among the specialized positions, we found a wide range of technicians with specific tasks, for instance drillers, blasters, bombers, timbermen, welders, wreckers, skyline operators, or backhoe operators. Finally, at the bottom end, there were *abanteros* and *atraseros*.

There was a marked division between those positions that were at the high-end and those at the low-end of the working hierarchy. With the former having more economic benefits and power. Figures 1 and 2, provide a schematic illustration yet do not do full justice to the diversity on the ground. In informal mining, the high-end positions were part of what has been called an ASGM elite (Verbrugge, 2014), composed of the landowner and/or tunnel owner, financier, and team leader. The middle was reserved for those specialized positions that require specific skills. At the low end of the pyramid, were workers who have not accumulated the necessary skills to occupy a specialized position. These were underground workers (*atraseros*, *abanteros*), cooks, and stone washers (mostly women). In the case of formal mining, a very similar scheme was repeated, with the particularity of having a managerial administrative staff and a greater number of specialized positions occupied by professionals and/or engineers (something that happens in informal mining too, but less frequently). Moreover, as in this type of mining there is an emphasis on employee safety, monitoring and safety positions were more abundant. Finally, the base of the pyramid was composed of underground workers (*abanteros*, *atraseros*, or those who combine the latter two positions).

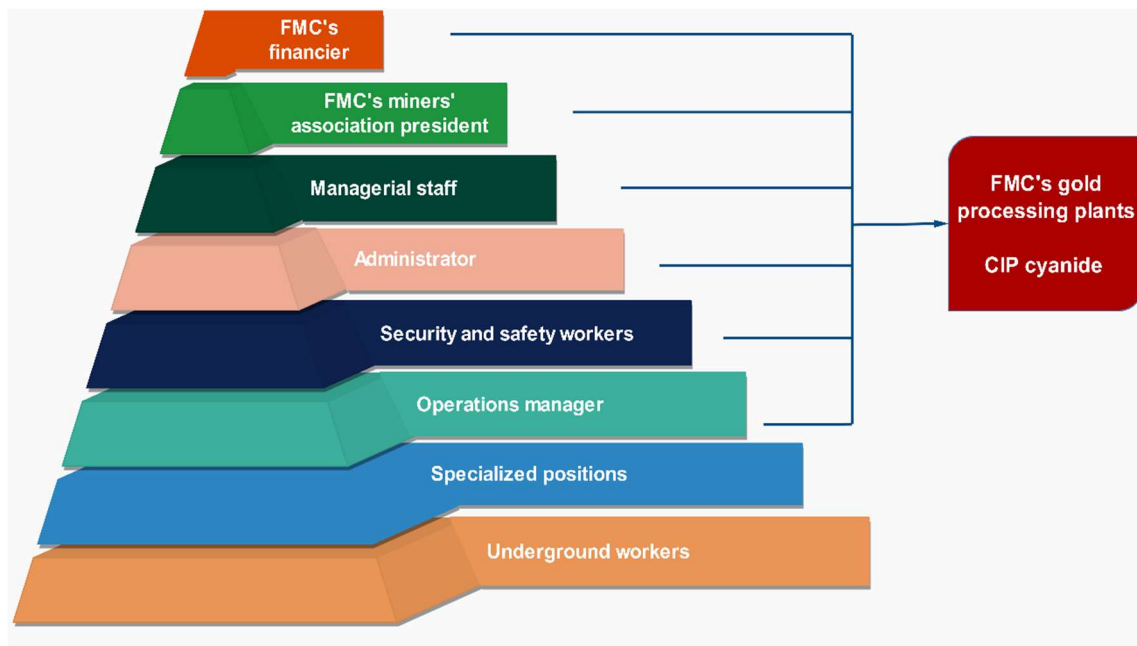
MALP used a CIP cyanide extraction process, which, also belonged to the owner. It was located outside the *Minahang Bayan* area, and access was only allowed to authorized workers from high-end positions. Underground workers' task in this phase was reduced to loading the ore sacks into the truck that carried the mineral to the processing plant. Information on the amount of gold processed and recovered was shared only with those in managerial positions. According to MALP's association president, the average production amounted to 7.4 million PHP (128,051 EUR) per month.

**Figure 1. Labour hierarchy in informal mining**



Source: Own elaboration

**Figure 2. Labour hierarchy in formal mining**



Source: Own elaboration

From our sample in MALP, 49.1% of respondents can be considered underground workers (*abantero*, *atrasero* and *abantero-atrasero*) and 35.1% specialized workers (timberman, blaster, packer, welder, wrecker, driver). Together, they were categorized as workers at the lower end of the labour hierarchy. One person in our sample was an operations manager (0.9%), 7% were security and safety workers,

and 7% were part of the managerial staff<sup>5</sup> (Table 1). In NOLP, 89.7% of our respondents were categorized as the lower end of the labour hierarchy, while 10.3% as the higher end (Table 2).

**Table 1. What is the position you occupy in the mine you are currently working in?**

Positions	Frequency	%
<i>Underground workers</i>	56	49.1
<i>Specialized positions</i>	40	35.1
<i>Operations manager</i>	1	0.9
<i>Security and safety workers</i>	8	7.0
<i>Managerial staff</i>	8	7.0
<i>No response</i>	1	0.9
<b>Total</b>	<b>114</b>	<b>100</b>

Source: Own elaboration

**Table 2. Hierarchy positions by type of mining**

Hierarchy position	Formal		Informal	
	Frequency	%	Frequency	%
<i>Low end</i>	96	84.2	78	89.7
<i>High end</i>	17	14.9	9	10.3
<i>Missing values</i>	1	0.9	0	0
<b>Total</b>	<b>114</b>	<b>100.0</b>	<b>87</b>	<b>100</b>

Source: Own elaboration

Regarding the socio-demographic profile of the workers surveyed, in the case of MALP, 98% (112) were male and 1.8% (2) were female. The minimum age recorded was 16 and the maximum 64, with an average of 33, of which 25% said they were between 16 and 25 years old, 50% were 30 years old, and 75% were over 39 years old. In the case of NOLP, 79.3% (69) of the workers were male, and 10.7% (18) were female. The minimum age recorded was 18 and the maximum 66, with an average of 34, of which 25% said they were between 18 and 25 years old, 50% were 33 years old, and 75% were over 41 years old.

## 6.2. Payment systems

According to MALP's miners' association's president, all MALP workers were hired through a written contract and enjoyed the benefits of working under formal and regulated conditions. Moreover, when there was a surplus of production, workers received a 'privilege share' – a share divided amongst all workers once a specific production quota (target) has been reached.

- *So, you pay all your workers by salary, you don't pay by share?*
- *Here, the best practices are, that we have a salary and then if [there is] a good profit we have a sharing scale (interview with MALP's miners' association president, June 2019).*

<sup>5</sup> This percentage is calculated from the 4.4% of those who responded to the options 'team leader' and 'portal guard' in a multiple-choice question, plus positions that were found within the option 'other' and that were not part of the multiple-choice options. In detail, we counted the following positions found in 'other': mine supervisor, office staff, operations manager, geological mapper, chief fabricator, underground supervisor, safety officer.

However, in practice, a different scenario was observed. From a total of 114 surveyed workers, 92.1% mentioned that they were contracted under a verbal agreement, and only 2.6% said they were hired under a written contract (Table 3).

**Table 3. Types of formal mining contracts**

Value	Frequency	%
<i>Verbal agreement</i>	105	92.1
<i>Written contract</i>	3	2.6
<i>Other</i>	1	0.9
<i>No response</i>	5	4.4
Total	114	100.0

Source: Own elaboration

MALP had different payment schemes depending on the position. For example, managerial and security positions were paid on a monthly basis, or every 15 days. Specialized positions, received their payment once they completed their task. For example, a timberman would make an estimation of the time needed for a tunnel repair and negotiate a daily fee for his work. Once the repair was completed, he received his full payment. Furthermore, each position may have different fees, depending on the difficulty of the work and the specific skills of the worker. Having worked with many of these technicians on a long-term basis, MALP had a portfolio of specialized workers whom they call on when needed.

For workers at the bottom of the hierarchy, such as *atraseros* and *abanteros*, payment was different. For instance, *atraseros* (five to 10 per team) got paid as a team, based on the number of ore sacks they filled. The required minimum was 500 sacks of ore per day, taken from all operating tunnels. Each sack of ore was rated at 18 PHP (0.32 EUR), which amounts to an average of 9000 PHP per day from a total of 500 sacks. They worked two to three days a week, and the total amount was paid at the end of each week and divided amongst all team members. *Atraseros* did not have a fixed position and were hired seasonally (what locals refer to as ‘hired on call’), depending on the company’s operating activities.

On the other hand, *abanteros* obtained a fixed amount of 305 PHP (5.34 EUR) per day, hired seasonally and working an average of 12 hours per day, two days a week (or as needed). Within this system, it was also possible to receive a cash advance for emergencies, which is similar to a loan that needs to be repaid. According to MALP’s administrator, this advance was given ‘*especially for basic needs, because their salary [abanteros’ and atraseros’] is not enough*’ (MALP’s administrator, personal communication, June, 2019). However, 70% of MALP’s *abanteros* and *atraseros* mentioned they preferred the payment of ‘share in the production’. For the other payment options, 16.4% preferred ‘piece rate’, and 13.4% ‘fixed wage’ (see Table 4). The system ‘share in the production’ is more common in informal mining areas in Mindanao (see Verbrugge, 2015b; Verbrugge and Besmanos, 2016). Under this system, the division consists of a 70/30 or in some cases 60/40 share. That is, 70% or 60% of the output goes to the financier, and 30% or 40% is divided amongst all workers. Once workers receive their share, they take their sacks of ore to different processing plants (most commonly mercury ball mills) operating near or inside the village. Their direct participation in the processing of their ore influences the extent of knowledge workers have about their own revenues. Because of accumulated experience, they can make a rough estimation of how much gold can be extracted, based on the number of sacks they have taken.

**Table 4. Working positions and payment preference**

Working position	Type of payment (%)			
	Share in the production	Piece rate	Fixed wage	Total
<i>Abantero (digger)</i>	19.4	1.5	4.5	25.4
<i>Atrasero (hauler)</i>	17.9	14.9	9.0	41.8
<i>Abantero-Atrasero</i>	32.8	0.0	0	32.8
Total	70.1	16.4	13.4	100.0

Source: Own elaboration

At MALP, common responses from *abanteros* and *atraseros* who preferred the option of ‘share in the production’ were: *‘the more you work, the higher the share’*; *‘I prefer it because the payment depends on the amount of gold I get and sell’*. On the one hand, workers perceived that their efforts had a significant impact on the share they obtained, although revenues were uncertain and efforts may not have resulted in larger shares. On the other hand, it was observed that miners preferred to manage their own gold sale. However, this was only possible when shares were given in kind (ore sacks), which is a form of payment that occurs in informal mining only.

Having knowledge about the amount of gold that is extracted from the tunnels is important for *abanteros* and *atraseros*. It provides them with a concrete idea of the reward of their efforts, and they feel more in control of revenues. While MALP did not offer this option, they did offer a ‘privilege share’, consisting of 30% of the surplus of a specific production target, provided to workers as an incentive. Yet, without real transparency about the production amount, it was difficult for workers to be certain that they were receiving a fair 30% of the surplus.

The payment system of ‘share in the production’ was preferred not only by *abanteros* and *atraseros* but also by most MALP workers at the low (56%) and high-end (47.1%) of the hierarchy (see table 5).. Our initial hypothesis was that workers at the high end would prefer a fixed-wage payment system that, compared to a share in the production, offered more stability. However, there seems to be an inclination towards a system that is applied in informal mining areas.

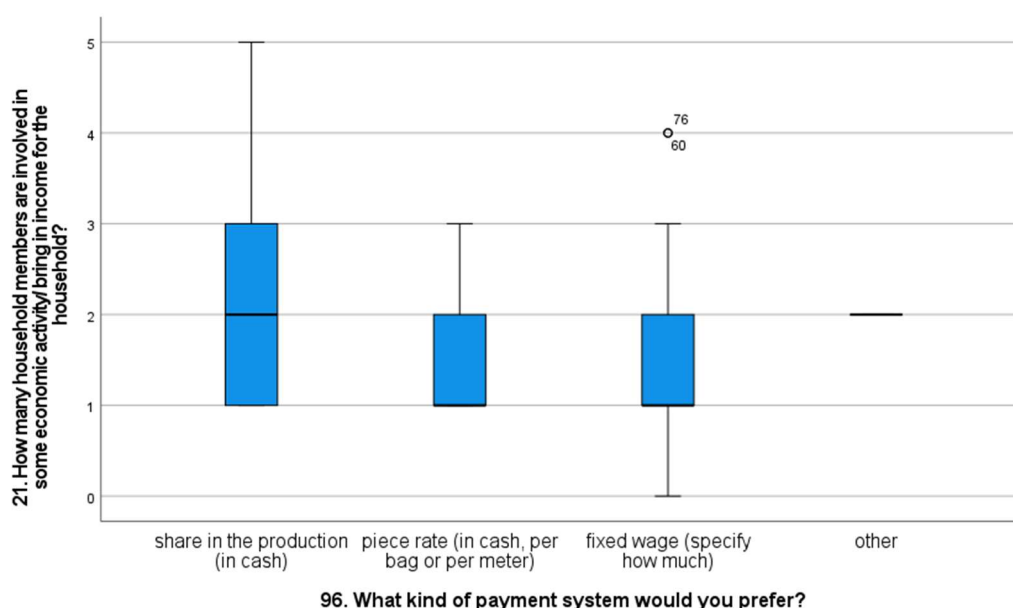
**Table 5. Hierarchy in working positions and payment preference (formal mining)**

Working positions-Hierarchy	Type of payment systems preferred (%)				Total
	Share in the production	Piece rate	Fixed wage	Other	
<i>Low end</i>	56	15.6	27.1	1.0	100.0
<i>High end</i>	47.1	17.6	35.3	0.0	100.0

Source: Own elaboration

In an effort to search for variables that could explain the reasons behind these choices, we conducted further quantitative analysis. However, no significant correlation that could quantitatively explain why workers preferred the system of share in the production, was found. Nevertheless, it could be seen that in cases where more members contributed to a household’s income, there was a higher preference for the share in production system (see Graph 1). It could be inferred that, since the economic contribution of more people to a household decreases the risks associated with the share in the production system, workers preferring this system can afford more uncertainty.

**Graph 1. Members contributing to the household income and payment preference**



Source: Own elaboration

At NOLP, the payment system is characterized by revenue-sharing. As we mentioned earlier, the division scheme is usually 70/30 or 60/40, where the highest percentage is given to the financier and/or tunnel owner. According to Bantay Kita, *'the quality of ore a person gets as a share of the mining activity depends on their actual involvement in the operation'* (2012: 18). Also, higher-grade sacks will be given to the higher positions,<sup>6</sup> whereas low-grade sacks are given to the lowest.

Regarding payment preference (see Table 6), we can observe that one-third (29.5%) of low-end workers preferred to have a share in the production, and another third (29.5%) preferred to have a fixed wage. Furthermore, 17.9% opted for a piece rate payment. Similarly, nearly half of high-end positions preferred a share in the production (44.4%) and a fixed wage (44.4%).

It can be observed that payment preferences do not differ much from MALP to NOLP. As explained, the sense of control over and knowledge of the amount of production, are important reasons for workers' preferences for these types of payment. In addition, since workers are in constant search of new mining areas to work in, the labour flexibility that these payment system offers becomes an advantage. Working mobility is mostly advantageous for *atraseros* and *abanteros*., as they work intermittently between NOLP and MALP. Once their work is completed, they look for other mining areas through networks of relatives, friends, or other mining workers .

**Table 6. Hierarchy in working positions and payment preference**

Working positions-Hierarchy	Type of payment systems preferred (%)				Total
	Share in the production	Piece rate	Fixed wage	Other	
Low end	29.5	17.9	29.5	23.1	100.0
High end	44.4	11.1	44.4	0.0	100.0

<sup>6</sup> However, for the case of landowners, this is different. Although they provide the land, they are not part of the mining operation. Therefore, they will not receive the same amount as the financier, but will still get an important percentage that is negotiated based on the size of the terrain.



Source: Own elaboration

In addition, at NOLP, most open responses to the question of why workers preferred the option 'share in the production' reflect a similar trend as in MALP. Workers think of this as a convenient payment: *'I prefer it because I can get money/cash for my family'*. Some participants emphasized necessity – *'I need money for daily survival'* – and the importance of teamwork: *'It is fairer because we work together as a team'*.

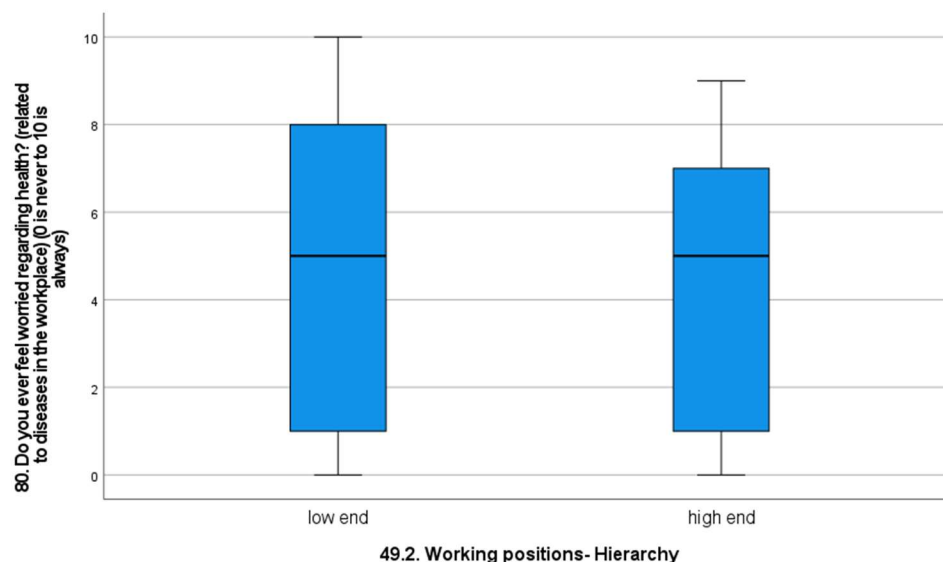
Respondents who preferred piece rate, argued that their efforts were proportionally rewarded: *'The more sacks you fill, the higher the income'*. Others saw it as an opportunity to work very hard for a short period and still obtain the same result: *'I have a greater income in only one week and I work one or two days a week'*.

Finally, respondents who preferred fixed wage perceived this payment as more stable and entailing better revenues. Some of the answers were: *'because as an atrasero, it is advantageous for me to earn more'*; *'Because it is very high'*; *'It will not go lower if it is fixed'*. Others preferred it because it would cause less stress: *'I am not pressured to make a quota'*.

### 6.3. Health and safety

It was observed that MALP provides safety equipment and monitors tunnel's maintenance. Workers are not exposed to hazardous substances like mercury or cyanide. Still, accidents do occur, and they are slightly more experienced by workers at low-end positions (12.5%) compared to workers at high-end positions (11.8%). A high number of these accidents occurred inside the tunnels (28.1%) due to a lack of or insufficient safety equipment (9.6%); a lack of safety measures (6.1%), which may include checks of the machinery, timber constructions, and underground support structures. While accident percentages at MALP are not alarming, our results suggest that a more careful focus on MALP's working conditions for low-end workers is still needed.

**Graph 2. Concern about health and safety vs. position in the working hierarchy in formal mining**



Source: Own elaboration

When asked whether they were worried about their health, low-end workers reported higher levels of concern than high-end workers (Graph 2). Frequent health symptoms experienced by workers were back pain (33.3%), stress (37%), lung/respiratory problems (22.8%), and skin rashes (17.5%). These are common symptoms related to the heavy physical labour required in underground mining (cf. Leung

and Lu, 2016) and to the presence of dust and silica (Cauda et al., 2018). Nevertheless, conversations with miners reflected that as long as they receive a satisfactory income, they will continue to work in conditions that could compromise their health. This does not mean that they are indifferent to these concerns. Workers are aware that preserving their health is important if they want to continue doing their job: *'Because if I'm sick I can't work. And if there is no work, there is no income either'*. However, they expect more support from MALP. While MALP has stated that all workers are granted health insurance (PhilHealth), it was observed that only high-end workers could count on PhilHealth, through their long-term contracts. Low-end workers were excluded from this benefit.

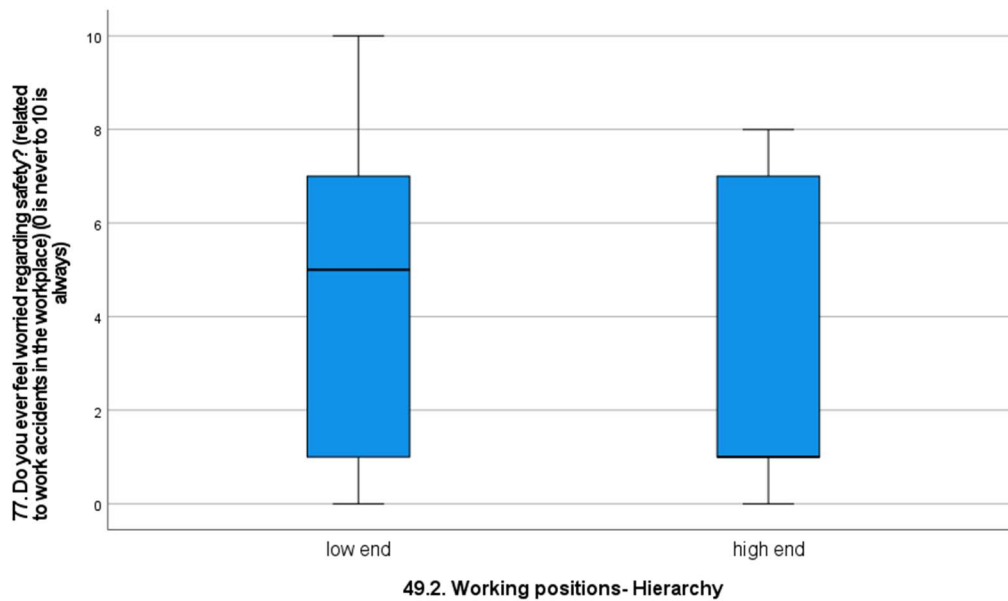
**Figure 3. Informal miner**



*Note:* Miner in the depths of the tunnel working with chisel and hammer, surrounded by ore sacks. By Eugenia Robles, 2019

Shifting to safety in the case of NOLP, there was a lower incidence of accidents than initially expected: 11.1% of *atraseros* and 33.3% of *abanteros-atraseros* reported to have suffered an accident. Common accidents were rock fall and timber collapse. High-end workers did not report any accident. Accordingly, in Graph 3 it is observed that low-end workers are notably more concerned about safety (average of 5) than high-end workers (average of 1).

**Graph 3. Concern about health and safety vs. position in the working hierarchy in informal mining**



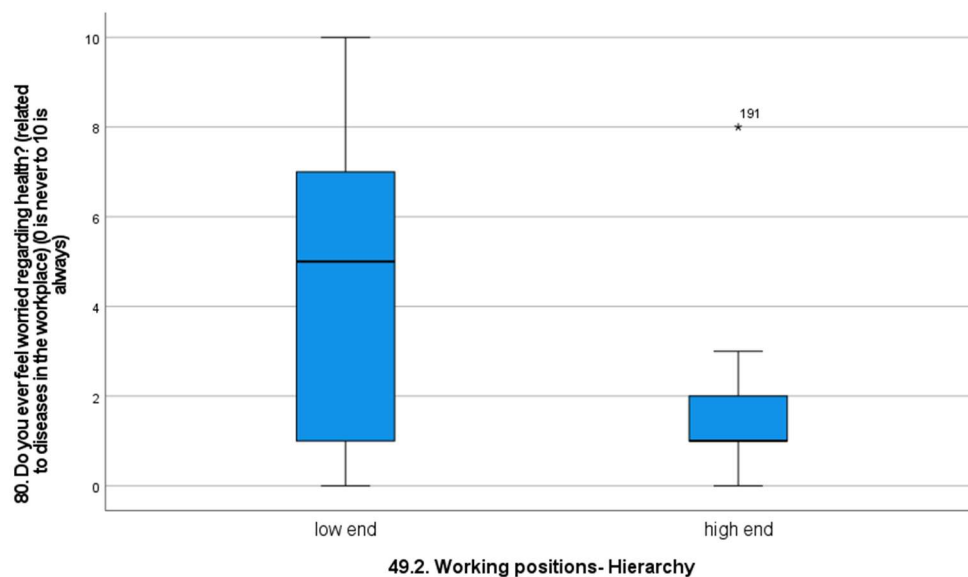
Source: Own elaboration

Moreover, 31% of respondents perceived the underground tunnels as safe areas of work, whereas 28.7% said they were uncertain places where accidents can hardly be avoided. For the former, safety is related not only to the physical structure of the tunnel, but also to the solidarity in the team. In NOLP, some miners considered their team a family, and labour relations were based on trust.

Regarding the frequency of accidents, 74.7% of workers indicated that these 'never' happened, versus 3.4% who indicated 'very often'. Moreover, 75.9% of respondents said that over the past year (2018) there were no accidents, whilst 16.1% said there was one. Finally, when it comes to death, 92% reported no deaths in 2018, while 5.7% reported one. These results seem to indicate that accidents and deaths in NOLP are not significantly frequent, as was initially expected – but some caution is needed in interpreting these self-reported figures.

Health in NOLP represents a concern, particularly for workers at the low end of the labour hierarchy (Graph 4). However, most workers assume this is 'part of the job' and are willing to expose their health in exchange for an income: *'It [the work] is hard, and we are usually sick. But it is harder to not have an income'* (atrasero, personal communication, May, 2019).

**Graph 4. Concern about health and safety vs. position in the working hierarchy in informal mining**



Source: Own elaboration

Common health symptoms in NOLP were reported to be stress (28.7%) and back problems (24.1%), followed by lung/respiratory problems (20.7%), skin rashes (17.2%), and eye problems (11.5%). Here, we also find urinary tract infections (6.9%), which occur in stone washers because of the long hours of exposure to water on mercury-polluted rivers. A word count of open questions revealed that the word 'mercury' was frequently mentioned by respondents – something that did not occur in the case of MALP. Mercury is highly present in NOLP because of ball mill processing plants functioning close to the mining area. It is released in the rivers, where stone washers (male and female) work all day long. Although there is information about the government's ban on the use of mercury, little is known on how its use affects people's health.

Similar to the case of MALP, health in NOLP is more problematic than safety and affects mostly low-end workers. In this case, the presence of mercury poses a potential danger to the entire population, and more information on how it affects health is needed. Unlike MALP, NOLP does not offer health insurance, yet it seems that low-end workers in both cases suffer equally from different mining-related illnesses, and neither receive proper medical support.

## 7. Discussion: does formalization make a difference?

Based on the quantitative and qualitative evidence presented in this article, four observations can be made about working conditions in ASGM, and how these are (not) affected by formalization. First, we observe a high degree of heterogeneity in the workforce, both in formal and in informal mining. While some workers are involved in highly demanding manual labour inside or outside tunnels, ASGM operations in the fieldwork sites also boasted a group of 'high-end' workers involved in specialized and administrative work. While this finding is firmly in keeping with a growing body of empirical research on ASGM (e.g. Ferring et al., 2016; Radley, 2020), it is important to highlight it once more, because understanding these different positions with their respective tasks, skills, working conditions, and remuneration is an important precondition for making informed claims about 'decent work' in ASGM (McQuilken, 2021).

Second, we observe high degrees of informality even within formal mining. Particularly at the lower ends of the labour hierarchy, many workers at MALP are hired through verbal agreements, on a temporary basis. This confirms earlier research in the Philippines (Verbrugge and Besmanos, 2016) and elsewhere (De Theije, 2020; Selin and Selin, 2020; Fisher, 2007), which highlighted how formalization efforts fail to address pervasive informality in the workforce. In essence, this reliance on cheap and irregular labour allows mining to respond to the financial and geological uncertainties inherent in gold mining by releasing and absorbing labour according to the needs of the ‘mining cycle’ (Verbrugge and Geenen, 2020). The alternative – hiring low-end workers on a permanent basis – would clearly represent an economic risk for ASGM financiers. However, this implies that workers in formal mining do not automatically have access to non-wage benefits such as health insurance or to a fixed and regular salary. Instead, remuneration in formal mining operates in the same way as in informal mining: through complex revenue-sharing mechanisms.

Third, however, our findings indicate that workers have a clear preference for this seemingly uncertain payment system. Not only does it provide them with a sense of control over the fruits of their own work and the impression of being paid a fair share, but it also keeps alive the dream of ‘striking it rich’. This is a common phenomenon, which has been described in the ASGM literature as ‘gambling’ (Espinoza et al., 2020; Geenen, 2018). While the system of the privilege share in place at MALP attempts to mirror this practice, it is not transparent, as ore is processed outside the mining area.

Fourth, in the domain of health and safety, differences between formal and informal mining are not as stark as one would expect. While workers in formal mining reported slightly fewer accidents than workers in informal mining, perceptions of safety do not vary considerably across the formal–informal divide. Moreover, in both cases, high-end workers reported a lower exposure to accidents than lower-end workers. Looking at health risks, workers in formal and informal mining experience similar symptoms: stress, back pain, lung/respiratory problems, and skin rashes. While some of the higher-end workers in formal mining have access to health insurance and regular medical check-ups, this does not appear to be the case for low-end workers. However, a notable difference between informal and formal mining is the fact that in the latter, processing takes place outside of the mining area, which means that mine workers (as opposed to processing labour) are not directly exposed to mercury.

Nevertheless, if there is a contribution that formalisation has on these case studies in the Philippines, it would be in relation to improving workers’ safety. The type of tools and equipment that MALP provides to its workers, both at lower and higher ends, is far better than those observed in NOLP. Examples include proper safety suits (helmet, overalls, boots) and access to the depths of the tunnel using an elevator and concrete-filled steel tunnel structures. These are continuously monitored, assuring maintenance and quality.

The results of our analysis enable us to question the assumption that formalization will automatically lead to improved conditions for ordinary workers. Instead, we find that the logic of informality is reproduced within formal mining, which continues to rely on cheap and irregular labour to respond to the uncertainties of the gold mining cycle. This has important consequences for workers, who are trapped in a situation of pervasive uncertainty and face a lack of access to formal social protection schemes. At the same time, it is crucial to recognize that workers do not automatically reject flexible labour arrangements and have a strong preference for revenue-sharing arrangements over fixed salaries.

Clearly, approaches to formalizing ASGM are not static. In their 2018 ‘Handbook for Formalizing ASGM’, UNITAR and UN Environment promote a bottom-up approach that focuses on ‘those who are most marginalized, excluded, or discriminated against’ (UNITAR and UN Environment, 2018: 20) and

that pays special attention to gender and human rights issues. In its recent 'State of the ASM Sector' report, the World Bank-supported initiative Delve talks about a 'holistic formalization' (World Bank, 2020: 4) that pays explicit attention to labour. This is framed in line with SDG 8 (decent work and economic growth): 'The 2020 State of the Sector Report argues that if harnessed effectively, ASM has the potential to offer more inclusive and sustainable economic growth, productive employment, and crucially, decent work for tens of millions of people worldwide' (World Bank, 2020: 20). The findings in this article are an essential reminder that formalization policies need not simply engage with realities and inequalities in ASGM, but also need to try and take into account the preferences of workers, all of whom have different experiences. The data presented in this article show that workers' preferences are not necessarily aligned with mainstream discourses. By mainstream discourses we refer to ILO's decent work agenda in alignment with the Universal Declaration on Human Rights that have promoted fair labour standards and were adopted in different treaties and conventions by State Members worldwide. This study is an invitation to question what has hitherto been understood as decent work. The particularities of these cases indicate that we must diversify our understanding of the needs and preferences in these workspaces (see also De Neve, 2012).

Finally, efforts to formalize (and by extension certify) ASGM need to consider the fact that workers, while facing risks and uncertainties, do not necessarily see regular, salaried employment as a magical solution. Hence, inclusive formalization efforts should look for not simply reinventing the wheel but need to build on what works for all those involved in the sector, rather than just a select few. Further studies that look at bottom-up labour dynamics in other types of ASGM in the Philippines are also encouraged. These studies should look at the types of payments, safety, health and extra benefits that workers have. They should analyse these elements in line with the type of workers' job and position in the labour hierarchy, in mining areas operating with and without legal permits.



## References

- Banchirigah, S.M., Hilson, G., 2009. De-agrarianization, re-agrarianization and local economic development: Re-orientating livelihoods in African artisanal mining communities. *Polic. Sci.* 43(2), 157–180.
- Bantay Kita. 2012. A Background Study on the Small-Scale Gold Mining Operations in Benguet and South Cotabato and their Impact on the Economy, the Environment and the Community. Bantay Kita.
- BAN Toxics. (2019). *Illicit Mercury Flows and Governance Practices in Mindanao, Philippines*. BAN Toxics. Retrieved from [https://www.planetgold.org/sites/default/files/2020-06/2019.%20BAN%20TOXICS.%20The%20Philippines\\_%20Illicit%20Mercury%20Flows%20and.pdf](https://www.planetgold.org/sites/default/files/2020-06/2019.%20BAN%20TOXICS.%20The%20Philippines_%20Illicit%20Mercury%20Flows%20and.pdf)
- Bridge, G., 2004. Mapping the bonanza: Geographies of mining investment in an era of neoliberal reform. *The Prof. Geogr.* 56(3), 406–421.
- Cauda, E., Chubb, L., Reed, R., Stepp, R., 2018. Evaluating the use of a field-based silica monitoring approach with dust from copper mines. *J. Occup. and Environ. Hyg.* 15(10), 732–742.
- Clausen, F., Barreto, M.L., 2011. Property rights theory and the reform of artisanal and small-scale mining in developing countries. *J. of Politics and Law* 4(1), 15–26.
- Cortés-McPherson, D., 2019. Expansion of small-scale gold mining in Madre de Dios: ‘Capital interests’ and the emergence of a new elite of entrepreneurs in the Peruvian Amazon. *The Extractive Industries and Society* 6(2), 382–389.
- Damonte, G.H., 2016. The ‘blind’ state: Government quest for formalization and conflict with small-scale miners in the Peruvian Amazon. *Antipode* 48(4), 956–976.
- De Haan, J., Geenen, S., 2016. Mining cooperatives in Eastern DRC. The interplay between historical power relations and formal institutions. *The Extractive Industries and Society* 3(3), 823–831.
- De Theije, M., 2020. Brazil: Forever informal. In Geenen S., Verbrugge, B. (Eds.), *Global Gold Production Touching Ground: Expansion, Informalization, and Technological Innovation* (1st ed.). Palgrave MacMillan, London, pp. 117-136
- DENR, 2007. Memorandum Circular No. 2007-07: Clarificatory guidelines in the implementation of the small-scale mining laws, <http://mgb.gov.ph/Files/Policies/dmc-2007-07.pdf> (accessed 8 April 2014).
- De Neve, G. (2012). Fordism, flexible specialization and CSR: How Indian garment workers critique neoliberal labour regimes. *Ethnography*, 15(2), 184-207. doi: 10.1177/1466138112463801
- EITI. 2015. Philippines EITI Scoping Study On Small-Scale Metallic Mining. PH-EITI.
- Espinoza, C., Seccatore, J., & Herrera, M. 2020. Chilean artisanal mining: a gambling scenario. *REM - International Engineering Journal*, 73(2), 241-246.
- Ferring, D., Hausermann, H., Effah, E., 2016. Site specific: Heterogeneity of small-scale gold mining in Ghana. *The Extractive Industries and Society* 3(1), 171–184.
- Fisher, E., 2007. Occupying the margins: Labour integration and social exclusion in artisanal mining in Tanzania. *De. and Chang.* 38(4), 735–760.

Francisco, R., 2012. Special report: Philippines' black market is China's golden connection. <https://www.reuters.com/article/us-philippines-gold-idUSBRE87M02120120823>

Fold, N., Bosse Jønsson, J., Yankson, P., 2013. Buying into formalization? State institutions and interlocked markets in African small-scale gold mining. *Futures*. 62, 128–139.

Garcia, G. (2021). Duterte Says Yes to Mining in the Philippines. But at What Cost? [Blog]. Retrieved from <https://th.boell.org/en/2021/08/27/duterte-mining-election>

Geenen, S. 2018. Underground dreams. Uncertainty, risk and anticipation in the gold production network. *Geoforum*, 91, 30-38.

Geenen, S., 2012. A dangerous bet. The challenges of formalizing artisanal mining in the Democratic Republic of Congo. *Resour. Polic.* 37(3), 322-330.

Geenen, S., Stoop, N., Verpoorten, M., 2020. How much do artisanal miners earn? An inquiry among Congolese gold miners. *Resour. Polic.* 70, 101893.

Hilson, G. & Garforth, C. 2012. "Agricultural Poverty" and the Expansion of Artisanal Mining in Sub-Saharan Africa: Experiences from Southwest Mali and Southeast Ghana. *Population Research and Policy Review*, 31(3): 435–464.

Hilson, G. & Van Bockstael, S. 2012. Poverty and Livelihood Diversification in Rural Liberia: Exploring the Linkages between Artisanal Diamond Mining and Smallholder Rice Production. *Journal of Development Studies*, 48(3): 413–428.

Hilson, G., Hilson, A., McQuilken, J., 2016. Ethical minerals: Fairer trade for whom? *Resour. Polic.* 49: 232–247.

Hilson, G., Maconachie, R., 2017. Formalising artisanal and small-scale mining: Insights, contestations and clarifications. *Area* 49, 443–451.

Hilson, G., Zolnikov, T.R., Ortiz, D.R., Kumah C., 2018. Formalizing artisanal gold mining under the Minamata convention: Previewing the challenge in Sub-Saharan Africa. *Environ. Sci. & Polic.* 85, 123–131.

Holden, W., Nadeau, K., & Jacobson, R. D., 2011. Exemplifying accumulation by dispossession: mining and indigenous peoples in the Philippines. *Geografiska Annaler: Series B, Human Geography*, 93(2), 141-161.

Hook, A., 2019. The multidimensionality of exclusion in the small-scale gold mining sector in Guyana: Institutional reform, landlordism, and mineral uncertainty. *World Dev.* 123, 104607.

Hopkins Barriga, Á., Morel Salman, J., Granados Mandujano, M., Barrantes Cáceres, R., 2020. Un minero más sí importa: nuevas y viejas fronteras de la minería informal en el Perú. Instituto de Estudios Peruanos. <https://repositorio.iep.org.pe/handle/IEP/1177>

Hylander, L., Plath, D., Miranda, C., Lücke, S., Öhlander, J., Rivera, A., 2006. Comparison of different gold recovery methods with regard to pollution control and efficiency. *CLEAN – Soil, Air, Water* 35(1), 52–61.

IGF (2017). Global Trends in Artisanal and Small-Scale Mining (ASM): A Review of Key Numbers and Issues. Retrieved 5/10/2018 from. <https://www.iisd.org/sites/default/files/publications/igf-asm-global-trends.pdf>.

Leung, A., Lu, J., 2016. Environmental health and safety hazards of Indigenous small-scale gold mining using cyanidation in the Philippines. *Environ. Health Insights* 10, EHI.S38459.

McQuilken, J., 2021. To reach SDG 8: Decent work, we must embrace artisanal miners. <http://sdg.iisd.org/commentary/guest-articles/to-reach-sdg-8-decent-work-we-must-embrace-artisanal-miners/>

Miraflor, M., 2020. PH gov't losing mineral resources to black market. <https://mb.com.ph/2020/08/28/ph-govt-losing-mineral-resources-to-black-market/>

Ocampo, K., 2021. DENR: Creation of Minahang Bayan sites to generate jobs in the countryside. <https://business.inquirer.net/323612/denr-creation-of-minahang-bayan-sites-to-generate-jobs-in-countryside>

Pascual, L.J., Domingo, S., Manejar, A.J. 2019. Answering Critical Questions on Mining in the Philippines: Phase 2. PIDS discussion paper series NO. 2019-22.

Pedersen, R.H., Mutagwaba, W., Jønsson, J.B., Schoneveld, G., Jacob, T., Chacha, M., Weng, X., Njau, M.G., 2019. Mining-sector dynamics in an era of resurgent resource nationalism: Changing relations between large-scale mining and artisanal and small-scale mining in Tanzania. *Resour. Polic.* 62, 339–346.

Philippine Extractive Industries Transparency Initiative. (2022). Retrieved 28 March 2022, from <https://eiti.org/philippines>

Prescott, G. W., Maung, A. C., Aung, Z., Carrasco, L. R., De Alban, J. D. T., Diment, A. N., ... & Webb, E. L. 2020. Gold, farms, and forests: Enforcement and alternative livelihoods are unlikely to disincentivize informal gold mining. *Conservation Science and Practice*, 2(3), e142.

Radley, B., 2020. A distributional analysis of artisanal and industrial wage levels and expenditure in the Congolese mining sector. *J. Dev. Stud.* 56(10), 1964–1979.

Ramírez Guerrero, M., 2012. Territorialidad y conflicto en un contexto minero: el caso del municipio de Marmato, Caldas. *Ánfora* 19(33), 89–113.

Salas-Urviola, F., Calsina-Paricahua, L., Vilca-Salas, A., 2021. Analysis of the formalization process of artisanal and small-scale mining (ASM): Case region Puno-Peru. *Resour. Polic.* 73, 102–160.

Salman, T., Carillo, F., Soruco, C., 2015. Small-scale mining cooperatives and the state in Bolivia: Their histories, memories and negotiation strategies. *The Extractive Industries and Society* 2, 360–367.

Selin, H., Selin, N., 2020. *Mercury Stories: Understanding Sustainability Through a Volatile Element* (1st ed.). Boston, MA, The MIT Press.

Salo, M.S., Hiedanpää, J., Karlsson, T., Cárcamo Ávilac, L., Kotilainen, J., Jounela, P., Rumrill, R., 2016. Local perspectives on the formalization of artisanal and small-scale mining in the Madre de Dios gold fields, Peru. *The Extractive Industries and Society* 3, 1058–1066.

Seccatore, J., Veiga, M., Origliasso, C., Marin, T., De Tomi, G. 2014. An estimation of the artisanal small-scale production of gold in the world. *Sci. Total Environ.* 496, 3–8.

Siegel, S., and M. Veiga. 2009. Artisanal and small-scale mining as an extralegal economy: De Soto and the redefinition of “formalization.”. *Resources Policy*, 34(1-2): 51–6.

Nem Singh, J., & Camba, A. (2020). The role of domestic policy coalitions in extractive industries' governance: Disentangling the politics of "responsible mining" in the Philippines. *Environmental Policy and Governance*, 30(5), 239-251

Tubb, D. 2015. Muddy Decisions: Gold in the Chocó, Colombia. *The Extractive Industries And Society*, 2(4), 722-733.

Tubb, D., 2020. Shifting livelihoods. Gold mining and subsistence in the Choco, Colombia. Seattle, WA, The University of Washington Press.

UNITAR, UN Environment, 2018. Handbook for Developing National ASGM Formalization Strategies within National Action Plans. Geneva, UNITAR & UN Environment.

Van Bockstael, S., 2014. The persistence of informality: Perspectives on the future of artisanal mining in Liberia. *Futures* 62, 10–20.

Veiga, M.M., Fadina O., 2020. A review of the failed attempts to curb mercury use at artisanal gold mines and a proposed solution. *The Extractive Industries and Society* 7, 1135–1146.

Verbrugge, B., 2014. Capital interests: A historical analysis of the transformation of small-scale gold mining in Compostela Valley province, Southern Philippines. *The Extractive Industries and Society* 1, 86–95.

Verbrugge, B., 2015a. Decentralization, institutional ambiguity, and mineral resource conflict in Mindanao, Philippines. *World Development*, 67, 449-460.

Verbrugge, B., 2015b. The economic logic of persistent informality: Artisanal and small-scale mining in the Southern Philippines. *Dev. and Chang.* 46(5), 1023–1046.

Verbrugge, B., Besmanos, B., 2016. Formalizing artisanal and small-scale mining: Whither the workforce? *Resour. Polic.* 47, 134–141.

Verbrugge, B., Geenen, S., 2020a. Global expansion. In: Verbrugge, B., Geenen, S., 2020. *Global Gold Production Touching Ground. Expansion, Informalization, and Technological Innovation* (pp. 53-68). Basingstoke, Palgrave.

Verbrugge, B., Geenen, S., 2020b. Informalization. In Verbrugge, B., Geenen, S., 2020. *Global Gold Production Touching Ground. Expansion, Informalization, and technological innovation* (pp. 69-96). Basingstoke, Palgrave.

Wiener Ramos, L., 2019. *La Gobernanza de la Minería en Pequeña Escala en el Perú*. Lima, CooperAcción.

World Bank. 2020. 2020 State of the Artisanal and Small-Scale Mining Sector. Washington, D.C.: World Bank.