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InforMining
An in-depth study of informalization in global gold production

The Philippines

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Contents

List of figures and tables

1 Introduction

Although artisanal and small-scale mining (ASM) activities support the livelihoods of over 44 million people worldwide and their strategic importance for economic development is widely recognized, there is still a lack of systematic data on ASGM (World Bank, 2020). As these activities are largely informal and therefore by definition not recognized or registered by the government, hardly any official figures exist. In many contexts, artisanal miners are even criminalized, which does not encourage them to report their activities, even to academic researchers. In addition, miners' production is generally variable, as it depends on seasonal fluctuations, availability of financial resources, technology and simple luck. This makes it very difficult to obtain data on production and revenues in mines (Geenen, Stoop, & Verpoorten, 2020). Although a range of authors in social, anthropological and development sciences have produced excellent in-depth case studies, often at a very local level, quantitative studies that present systematic survey data are still missing. This is confirmed by an initiative launched by the World Bank and the NGO Pact which aims to create a global data platform on ASM: Delve.[1] This report aims to contribute to filling the data gap by presenting the results of a survey conducted among ASM workers in three gold mining areas in the Philippines.

This paper is part of the project 'InForMining. An in-depth study of informalization in global gold production' funded by the Flemish Research Foundation (FWO) and supervised by Prof. Dr. Sara Geenen and Dr. Boris Verbrugge at the Institute of Development Policy (IOB), University of Antwerp, Belgium.[2] The project has two main objectives: (1) to study informalization processes in the global gold production system and (2) to study their effects on workers. Responding to the first objective, we studied informalization as one of the structural trends characterizing global gold production. This resulted in the book *Global Gold Production Touching Ground* (Verbrugge & Geenen, 2020). In response to the second objective, we studied the question of informal labour in mining areas in three countries across three continents: Peru in Latin America, the Philippines in Asia and the Democratic Republic of Congo (DRC) in Africa. In this paper, we present the results of a survey carried out by PhD student Eugenia Robles Mengoa and the team of Bantay Kita in the Philippines. Bantay Kita is a coalition of social organizations dedicated to the transparency and accountability of extractive industries. The data were analysed by Eugenia Robles and consultant Rafael López.

This paper addresses the following question: what are the characteristics of informal labour in artisanal and small-scale gold mining (ASGM) in selected mines in the Philippines? Concretely, it presents a number of descriptive statistics on the workers, the organization of the work and labour conditions in three mining areas. On the basis of these data, we can draw seven major conclusions:

(1) The great majority of workers never received any form of training. Their knowledge on mining is self-taught or taught by a friend. They are rarely promoted; most remain on the low end of the hierarchy as *abanteros* (skilled workers) or *atraseros* (ore packers and haulers);

(2) Most workers do not have detailed information on the effects of mining on their health. Additionally, there is an absence of knowledge on safety measures and labour rights;

[1] See https://delvedatabase.org.

[2] The project received clearance of the ethical commission for social sciences and humanities at the University of Antwerp (SHW_17_51).

(3) Although workers experience symptoms such as stress, skin rashes and lung/respiratory problems, they do not perceive them as a matter of concern. They think that getting sick cannot be avoided and prefer to focus on the income that mining provides;

(4) Accidents are considered part of the job. Thus, the danger or risk inherent in accidents is relativized, and the significance of physical injuries or health problems caused by them is minimized. As a result, it is hard to measure the extent to which safety challenges affect workers' lives and gold production;

(5) Child labour represents a major problem in the researched areas in the three provinces (especially in Davao de Oro);

(6) Informal mining practices were encountered in the researched case of the formal mining association. A great majority of low-end workers were hired on a verbal contract;

(7) Workers at the formal mining association preferred a sharing scheme payment, which is part of an informal mining context.

In the following section, we very briefly present the literature on informal labour in order to situate our research project. In section 3, we outline the methodology used, and we describe the case studies in section 4. Section 5 presents the results of our survey in a series of descriptive statistics, while section 6 provides a number of recommendations based on our findings.

2 Informal labour in ASGM

Following the structuralist approach proposed by Portes, Castells, and Benton (1989), we want to draw attention to the role and position of informal labour in global capitalist production networks, to the functional links between the informal and the formal economy and to the role of the state in implementing processes of informalization. These informalization processes are a recurrent and systemic response to accumulation crises in the capitalist economy (Tabak & Crichlow, 2000). Specifically, in order to counteract falling profit rates, employers resort to the exploitation of cheap and flexible informal labour. This enables them to avoid 'the costs of social security obligations and other substantial overheads associated with operating in the formal sector' (Meagher, 1995, p. 260). The lead firms in global production networks (GPNs) not only relocate some tasks in the production process to low-cost destinations but also outsource tasks to smaller firms and in some cases even to home-based production units that make extensive use of flexible and informal labour. The resulting gains in competitiveness and productivity are 'appropriated as profits by large firms and employers, and are not passed on to workers in the form of improved wages and conditions' (Phillips, 2011, p. 384). Instead, we have seen the growth of a parallel workforce working that operates alongside more permanent workers and faces the prospect of increased insecurity and precarity (Harriss-White, 2010).

The literature on global value chains (GVCs) and GPNs has contributed much to the understanding of working conditions and opportunities for social upgrading in many different supply chains (Barrientos, Gereffi, & Rossi, 2011; Coe, Dicken, & Hess, 2008; Selwyn, 2011). However, few authors in these fields have explicitly addressed issues related to informal labour (with the exception of works such as Mezzadri, 2010 and Phillips, 2011). Moreover, they have not included mineral production – the 'beginning' of all GVCs – in their analysis. In our book *Global Gold Production Touching Ground* (Verbrugge & Geenen 2020), we fill this gap by developing a framework linking local 'crystallizations' of gold production – 'dynamic and interconnected sets of gold mining practices, in which factors of production and associated social relations of production crystallize in particular ways' (Verbrugge & Geenen 2020 p.6)– to global structural trends. We argue that ASGM is functionally integrated into global mineral production networks, as it provides access to cheap and flexible labour.

By operating outside formal regulatory frameworks, ASGM avoids the costs associated with fiscal and environmental regulation. By relying on a flexible, informal workforce, it does not have to adhere to existing labour regulations. ASGM usually operates through complex revenue-sharing arrangements that bring together workers and financiers, and in some cases also landowners, customary and/or statutory authorities and various other rent-seekers. These income-sharing arrangements are often seen as legitimate and can create opportunities for social mobility, which is one reason why ASGM is so attractive in a depressed rural environment. At the same time, they allow capital owners to outsource financial risk to labour. In addition, there are several categories of workers – such as those involved in transport, crushing or mineral processing – who are not part of these revenue-sharing arrangements and are paid a wage or are paid based on tasks performed. Finally, it is increasingly clear that the current trend towards more capital-intensive and technologically advanced ASGM often goes hand in hand with the emergence of more exploitative labour arrangements (Verbrugge & Geenen, 2020). From this perspective, ongoing formalization efforts that focus on the granting of mining licences to ASGM operators overlook a key point, namely that it relies on an informal, cheap and flexible labour force. Therefore, even if ASGM is formalized, exploitative labour arrangements can remain intact or become even more exploitative. In short, government efforts to formalize ASGM may paradoxically reproduce the logic of informalization.

The survey results presented in this report speak to these debates. They demonstrate the great variety in workers and occupations, which needs to be taken into account when designing formalization strategies. They also show that despite the formalization policies already in place, work in ASGM remains organized in largely informal ways, which does not effectively protect workers' interests. This working paper will form the basis for future and more refined analyses of questions of formalization and informal labour protection.

3 Methodology

We used a mixed-methods approach (Creswell & Clark, 2018) that integrated qualitative and quantitative data gathered during a 10-week stay in the Philippines (from May to July 2019). In this report, three different cases of ASGM in the region of Mindanao were analysed: Diwalwal in the province of Davao de Oro, Loring in the province of Agusan del Sur and T'boli in the province of South Cotabato. Mindanao is the second-largest island in the Philippines. According to the International Fund for Agricultural Development (2012), it has the largest concentration of ethnic minorities (61%) and many indigenous peoples' (IP) territories overlap with important gold deposits (Wetzlmaier, 2012). The ancestral lands of IPs have become an attractive ground for large- as well as small-scale mining operations, mostly because of the Indigenous Peoples' Rights Act (IPRA), part of the Republic Act 8371, which grants them rights to the management and use of their land's natural resources (Wetzlmaier, 2012). The cases of Loring and T'boli presented in this report are interesting examples of how tribal leaders have negotiated the coexistence of small- and large-scale mining operations on their ancestral lands.

In terms of data collection, a survey with a sample size of 601 was implemented across three mining areas located in municipalities in three different provinces on the island of Mindanao. Of these 601 respondents, 201 were from the mining area of Mount Diwata – widely known as Diwalwal – in the municipality of Monkayo, province of Davao de Oro (former Compostela Valley); 201 were from a mining area located in *barangay* (village) Kematu in the municipality of T'boli, South Cotabato; and 199 respondents were from two different mining areas in the municipality of Rosario, province of Agusan del Sur: the informal mine of Loring and a formal mining company that we will simply refer to as FMC.

We did not have access to data on the total population of ASGM miners in these municipalities, as informal miner are not registered and their number heavily fluctuates with variations in production, material and financial constraints and seasons. We used purposive

sampling techniques to make sure different jobs were represented in the survey. Of all respondents, 80% were sampled among the labourers at the 'low end' of the labour hierarchy, who do a variety of less-remunerated jobs. On the site, we had to adjust to the circumstances and invite people who were willing and available to participate in the survey (convenience sampling). This resulted in some limitations. For instance, ball mill owners refused to participate in the survey because they generally do not have legal permits to operate and make use of mercury. Our sample is thus not representative of all mineworkers in these areas, but it is illustrative of a variety of jobs people are doing.

The survey was composed of 121 structured and open questions and was implemented with the help of six local enumerators who spoke Bisayan, Tagalog and English. The answers to open questions were written down by the enumerator, who attempted to stay as close as possible to respondents' answers. The survey data were analysed using R (for data analysis and to make graphs), SPSS and Microsoft Excel (for further analysis on specific questions).

With respect to qualitative methods, the research relied on the following tools:

(1) Participant observation of the work performed in each mining area, often conducted outside tunnels. Observation inside tunnels took place in cases where the tunnel was active and workers would allow researchers to enter. Additionally, family dynamics in the surrounding communities involved in mining activity were observed;

(2) Interviews and informal conversations with workers and people directly or indirectly involved in the mining activity – since translation was made right after the conversation took place the fluid pace of these conversations was limited by the translation from native languages to English;

(3) Field notes, taken during and after the interviews and focusing on labour relations and gold commercialization;

(4) Audiovisual materials, where photography allowed the researcher to engage with locals who were asked for permission to be photographed during their work in the mines and everyday life in the mining areas;

(5) Participation in local training on the regulation of ASGM organized by Bantay Kita and several meetings held by local authorities, which enhanced our knowledge of the context. Much of the local engagement was facilitated by Beverly Besmanos, Mindanao subnational coordinator for Bantay Kita Philippines;

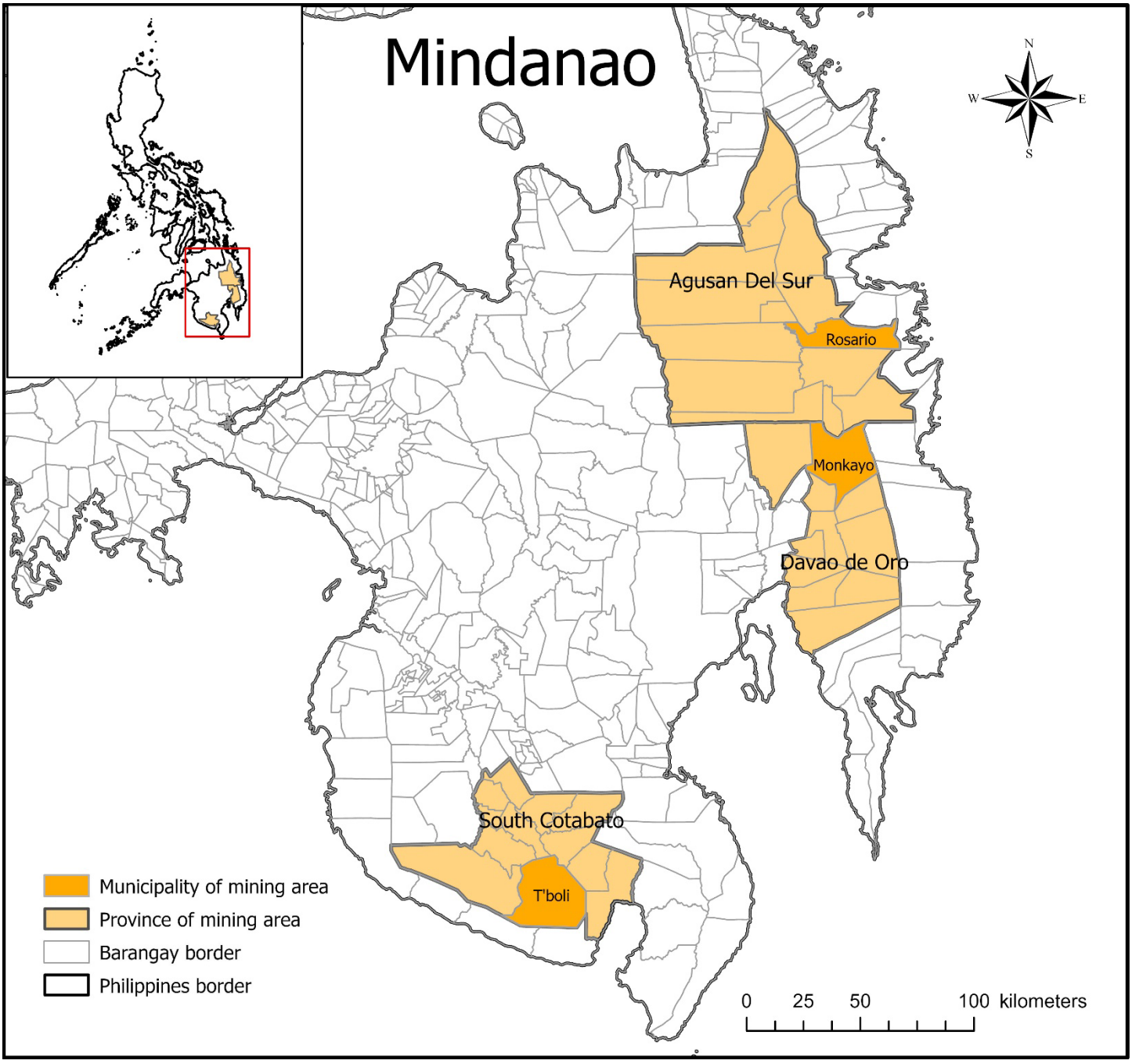
(6) Desk research included consultation of national statistics and the existing literature on gold mining in the Philippines, legal documents and reports by institutions working on the topic of mining.

We ensured that participants consented to our survey and open interviews. All dialogues and interactions with participants were voluntary; no coercion was applied. For the survey, a request for permission was sent to local tribal authorities of the different *barangays*, miners' associations and the president of FMC's miners' association. In this letter, we introduced the research project, providing a printed copy of the survey as a supporting document. Each respondent was given an explanation of the aim of the research, and anonymity was guaranteed by the use of codes for each respondent. For open interviews with local authorities, an official letter was issued prior to the interview, introducing the research project and aim of the conversation. In cases in which a letter could not be issued, an oral explanation was given to the interviewee.

The findings of this study should be seen in light of two limitations. First, the data on individual direct income from mining and volumes of gold production contain several gaps. A potential reason is respondents' hesitation to share information they perceived as confidential, more so in the case of informal mining as this takes place at the margins of legality. Additionally, respondents pointed to

the intermittent gold production in these areas as making it difficult to calculate average annual or monthly gold production. The numbers that were gathered contain great variations that affect the calculation of an accurate average.

Figure 1. Map of the region of Mindanao, the Philippines



Source: own elaboration

3.1 Diwalwal, province of Davao de Oro

Figure 2. Location of Diwalwal, province of Davao de Oro

Source: Wikipedia and Google maps

Also known as Mount Diwata, Diwalwal is a *barangay* and mining area of the municipality of Monkayo in the province of Davao de Oro (former Compostela Valley). It is located in a range of volcanic mountains, at the upper part of the Mamunga River. The creeks of the mountain flow into the Mamunga and Navoc Rivers, whose waters ultimately flow into the Agusan River that crosses the provinces of Agusan del Sur and Agusan del Norte. Diwalwal's tropical climate and geography make it prone to heavy rains, especially during monsoon season (July to September), when typhoons are a constant threat. As a result, landslides are experienced frequently and are aggravated by mining activities. In terms of demographics, Diwalwal's latest population count was 5,350 (Philippines Statistics Authority [PSA], 2020). The majority of its population is between 15 and 40 years old, with most families involved in and depending on mining activities.

In Diwalwal, two types of mining practices stand out: underground mining and stone washing (the latter mostly performed by women near the rivers). Stone washing is an artisanal method of gold collection and consists of washing stones and removing gold particles that may be caught in them or washing ore sacks to recover gold particles. Over the years, underground mining and gold processing have switched from manual methods to more sophisticated technologies. Underground mining uses heavy machinery, explosives, hydraulic pumps and electric drills, while gold processing uses ball mills and cyanide plants (Verbrugge, 2014). Moreover, with the increase of the international price of gold in 2010–2013, Diwalwal experienced a great amount of investment in the professionalization and capitalization of ASM, with technicians and engineers being hired to work inside the different tunnels (*destinos*).

Diwalwal acquired fame for being the 'gold rush father' of the region, and it is considered the largest illegal gold mining area in the country (Quitoriano, 2017). Its gold mining operations started in 1983 and peaked in 1985. During this time, the mining areas hosted around 100,000 people who arrived from all over Mindanao. They were attracted by the news of a gold rush (Quitoriano, 2017, p. 17) in the midst of a conflictive context, in which the guerrilla (New People's Army [NPA]) had spread and taken over the entire region of Davao de Oro. Ever since, conflicts over and political interests involving gold have resulted in chaos, pollution and death. Additionally, just like other gold mining areas in the Philippines, Diwalwal is surveilled by armed actors, most specifically the NPA, who exert control over mining activities through the collection of 'revolutionary taxes' (Verbrugge, 2015).

Throughout the years, Diwalwal's population has witnessed the decreeing of numerous regulations aimed at formalizing and restructuring the tenure of mining territories. However, some of these regulations did not have a real effect on ground. In 1991, the People's Small-Scale Mining Act (RA 7076), signed by President Corazon Aquino (1986–1992), aimed to 'systematize and rationalize small-scale development and utilization of mineral resources in certain mineral areas' (Quitoriano, 2017, p. 10). With this regulation, the government wanted to pressure miners into formalizing their activities. Diwalwal was particularly singled out, given its importance, yet the regulation was never really pushed through. Once the presidential term of Corazon Aquino came to an end, the pressure to implement this policy lessened. Mining in Diwalwal continued to function informally. According to locals, the succeeding presidential term of Fidel Ramos (1992–1998) and his government seemed to 'have forgotten' (A., personal communication, June 2019) about Aquino's formalization policies.

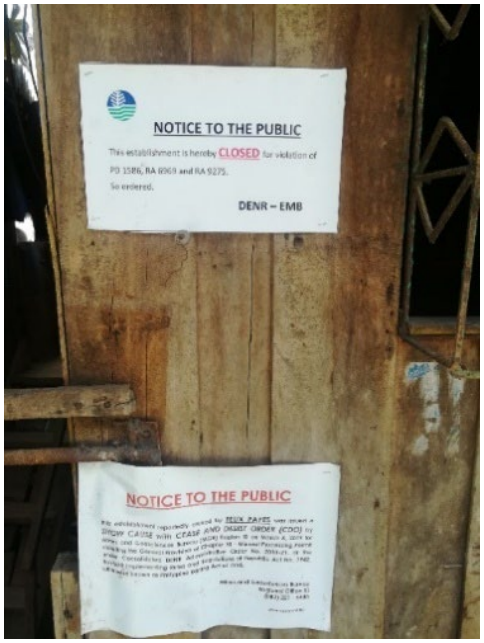
At the beginning of the 1990s, international concerns over the environmental impact of mining activities began to rise. In this light, Diwalwal became an emblematic case of illegal, chaotic and polluting gold mines, constantly featuring in newspapers' headlines. It obtained the name 'wild wild west' (Quitoriano, 2017), with violence constantly present as a result of the conflict between several armed actors involved in gold mining, political elites (IP leaders, town mayors), financiers and mineworkers. According to Verbrugge (2015), violent tensions reached their peak during this period, when municipal mayor and owner of JB mining company Joel Brillantes was in power. Looking to safeguard his economic interests, Brillantes decided to side with one of these groups in order to take control of a gold-rich area, which resulted in a full-blown underground war.

In the early 2000s, the conflicts in Diwalwal captured the attention of the national government. Consequently, in August 2002, the president at the time, Gloria Macapagal-Arroyo, declared a state of emergency for the area. By putting the Philippine Mining Development Corporation (formerly NRMDC) in charge of over 8,100 hectares, she turned Diwalwal into a mineral reservation and sent in the armed forces, purportedly to rid the area of communist insurgents (proclamation n.27) (Verbrugge, 2015, p. 196). The government suspended all mining activities until tensions would be solved. However, tensions did not decrease, and Brillantes was killed. As a result, the government and NGOs began to collaborate with the aim of ending illegality, environmental damage and insurgencies in the area. In this context, ball mill and carbon-in-pulp (CIP) (cyanide) gold processing plants were given the order to close. However, although the closure of gold processing plants decreased production volumes, this effect was only temporary. Once the intervention ended, the processing plants continued to function behind closed doors.

For example, in March 2019, the Department of Environment and Natural Resources (DENR) ordered the closure of all ball mills and batch-type CIP tank operators (Mellejor, 201). Around 1,800 ball mills were operating in Diwalwal when government officials from the DENR and members of the Monkayo Police were deployed all over town. Ball mills were closed and a 'notice to the public' (see Figure 3) was placed on each door. The notice read as follows:

> *This establishment reportedly owned by XXX was issued a SHOW CAUSE with CEASE AND DESIST ORDER (CDO) by Miner and Geosciences Bureau (MGB) Region XI – Mineral Processing Permit under Consolidated DENR Administrative Order No. 2010–21, or the Revised Implementing Rules and Regulations of The Republic Act. No. 7942, otherwise known as Philippine Mining Act of 1995.*

Figure 3. Notice to the public on the door of a ball mill

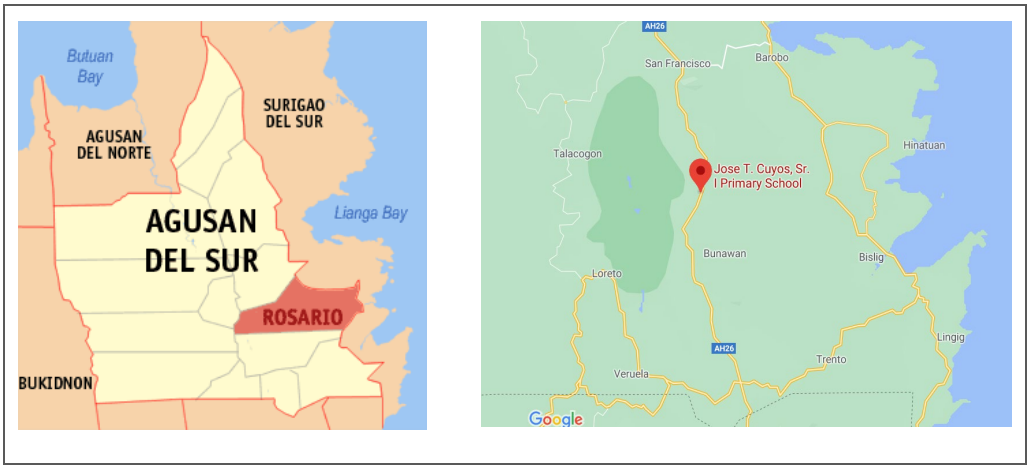


Source: photo by Eugenia Robles, Diwalwal, September 2019

By September 2019, when this research was conducted, half of these ball mills were still operating. Many did so behind closed doors, and a great number of the 'notices to the public' could be seen scattered on the street. Throughout the years, Diwalwal has continued its mining operations, despite government interventions and orders for ball mills to close. Although these interventions affected volumes of gold production, workers persisted and found ways in which they could continue working and processing gold.

3.2 Loring, province of Agusan del Sur

Figure 4. Location of Loring, province of Agusan del Sur



Source: Wikipedia and Google maps

Loring is a *purok* (community) located in *barangay* Santa Cruz, municipality of Rosario, Agusan del Sur province. According to the latest report of the office of the Sangguniang *barangay* of Santa Cruz (2019), Loring had 584 inhabitants, of which 310 were male and 274 female. Of these, 167 inhabitants are indigenous people. As of 2015 (latest census) *barangay* Santa Cruz's population was 8,659 (Philippines Statistics Authority, 2017) .

The mines of Loring are one of the many ASGM operations taking place in the ancestral domain of the Manobo tribes of Rosario. The predominant types of gold mining are underground mining and stone washing.[3] 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 local people continued mining as artisanal and small-scale miners. By the late 1980s, workers who were operating in the area established a 'small-scale miners' association' – which, for confidential reasons, we will refer to as SSMA – in order to have better control over and coordination of the mining territory of their operations, which they claim covered 700 hectares at the time. In 2006, the SSMA applied to register and formalize its mining operations. The process is ongoing today. SSMA's leader attributes this delay to the exhausting bureaucracy, which formulates new requirements and demands new documents all the time. In 2019, the Manobo tribal leaders of Rosario decided to consent to a mineral agreement (MA) in the form of a joint venture agreement (JVA) with Colonel Samuel Afdal, who is a former shareholder of Philsaga Mining Corporation (PSMC), one of the largest mining companies in the Philippines. Afdal has a history of creating different ventures in the mining industry, which – in addition to his previous experience at PSMC – made him eligible to apply for this type of agreement. With the JVA, Afdal obtained mining rights to the area on the condition that 1.5% of mining royalties are given to the Manobo tribes. Although the JVA could be beneficial for the tribal leaders and to some extent the local community, the SSMA has expressed its dissatisfaction. For about 10 years, they have been applying for their right to formalize and legally operate in an area of 700 hectares, as their application was returned, delayed and rejected. Of these 700 hectares, the MGB has recognized only 40, and yet the mining permit has not been issued. Since the waiting period for the permit continued to be prolonged, Colonel Afdal offered to concede those 40 hectares to the SSMA via the JVA, which would allow the association to exclusively and legally operate in this area. Despite its discontent, the SSMA agreed to this arrangement. When asked whether the SSMA was happy with these 40 hectares, its president stated:

> *No, we are not happy with that. (…) But for the sake of the legality of mining operations, and to not call small-scale miners illegal, we are obliged to accept the 40 hectares. For the sake of the legalization of our small-scale mining operations (SSMA president, personal communication, September 2020).*

By the second half of 2020, a new obstacle occurred in the process of legalization within the JVA. According to the president of the SSMA, tribal leaders found out that the mining area that Afdal intended to concede to the SSMA had less gold than what was initially agreed to. By December 2020, with the mediation of the MGB and the National Commission on Indigenous Peoples (NCIP), a new mining area of 40 hectares was delineated for the SSMA. However, a new resolution is still being processed and consent from all parties (including Afdal) was expected to be given by the third quarter of 2021. With the final resolution of this agreement, the SSMA can start its operations, and the authorities of *barangay* Santa Cruz and its tribal leaders will be able to access information on the management, operations and revenues of Afdal's mining company.

In 1987, a group of small-scale miners who had been mining in *barangay* 'B' since the 1970s created FMC. The creation of a miners' association enabled them to apply for *Minahang Bayan*, or a 'People's Small-Scale Mining Area', in the 1990s. This type of permit acknowledges land rights of IPs and any other legitimate landowners. Being located in an ancestral domain, FMC negotiated an agreement with the leaders of the indigenous tribes which granted them permission to operate in exchange for a share of 1.5% in

[3] As in Diwalwal and all over the Philippines, stone washing is mostly done by female miners named stone washers.

production (paid in sacks of ore). At the time, FMC registered 592,393 hectares of land that – due to an onerous bureaucratic process – were recognized as *Minahang Bayan* only in November 2012, 25 years after the FMC's first application.

In the Philippines, FMC is known as a highly successful case of formalized ASGM. It has been invited to present its best practices at several events. These practices include a ban on logging, the reforestation of landslide-prone areas, a ban on mercury use and on 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 main financier owns all FMC tunnels. This person has not only invested in mining but has branched out into other activities (mostly agriculture) and has assigned important positions to those he trusts. Some of these positions located at the higher end of the hierarchy within FMC are based on kinship relations.

As of June 2019, there were 52 active tunnels. However, FMC covers a vast territory in which inactive tunnels can be reactivated and new tunnels opened from scratch. Although this is not a common modality of work, financiers interested in taking on these operations can do so with the permission of the FMC's miners' association. They have to pay an initial registration fee of 5,000 Philippine pesos (PHP) (99 USD). After the first year, the fee is reduced to 2,500 PHP (50 USD) yearly. All operation expenses are carried by the financier, but profits must be shared with FMC.

All mineworkers pay a yearly membership fee of 180 PHP (3.5 USD) to FMC. According to FMC's president, all workers are paid a salary and receive a share in the production on top of that. This share is based on a 70-30 scheme, whereby 30% of production is distributed among workers and staff and 70% goes to the financier and/or tunnel owner.

3.3 T'boli, province of South Cotabato

T'boli is a municipality situated in the southern part of the province of South Cotabato. It has a population of 91,453 (Philippines Statistics Authority, 2017) . About 80% of its population consists of IPs Julian Asion, municipal environmental and natural r management officer of T'boli, personal communication, 17 June 2019),[4] whose territories are recognized as ancestral lands. T'boli is considered to be one of the foremost eco-cultural destinations in South Cotabato due to its rich history, nature and indigenous traditional crafts.

T'boli's gold mining exploration history dates back to the mid-1980s, when there was an influx of interested miners from different provinces. By the 1990s, the municipality had integrated the ASGM sector into its development plans. Initially, it registered and certified all existing ball mill processing plants and gathered them into a centralized area outside the *Minahang Bayan* in *barangay* Edwards. In 1994, the local authorities declared a 21-hectare territory to be *Minahang Bayan*. Ever since, registration procedures and different regulations have been implemented in the ASGM sector (International Labour Organization [ILO], 2020). Today, the municipality's gold reserves are managed by the Tribal Mining Corporation (TMC) – primary holder of the mineral production-sharing agreement in the *Minahang Bayan* (ILO, 2020). Most ASGM activities are located in two *barangays*, Kematu and Desawo (Bantay Kita, 2012). The case of T'boli is an exemplary one, as it is the only ASGM site in the country that is fully monitored and regulated by the local government (ILO, 2020, p. 56). Numerous policies have been implemented with the aim to monitor and negotiate terms that are

[5] We defined the mining area as the smallest administrative unit where the mine is located (e.g. village, *barangay*).

beneficial to small-scale miners, large-scale mining companies and IPs and to maintain cordial relationships with the IPs and tribal leaders.

The local government has been able to group small-scale miners into seven mining associations. These associations have permission to mine within a designated *Minahang Bayan* area. They are usually composed of mineworkers, financiers, ball mill operators and tunnel owners. Association leaders continuously consult with local authorities. This channel of communication has facilitated the implementation of local authorities' instructions by the associations. Most associations have tribal leaders, who in turn are the surface owners of the ancestral land. Some of these tribal leaders have occupied various positions in local governments, which helps safeguard the rights of their communities. In some cases, tribal leaders double as financiers and ball mill operators, which grants them a more powerful position in the local mining industry.

Besides the financiers that already operate inside the *Minahang Bayan*, interested financiers who would like to invest and start operations need to obtain the approval of the local government and associations. In the same manner, workers who would like to engage in mining are required to register with the local government and one of the associations. Once mining operations start, miners usually reach a minimum quota of 180 bags of ore (ILO, 2020, p. 61). Once ore sacks are piled up, miners need a delivery permit in order to take the sacks out of the *Minahang Bayan*. They have to present this permit to a monitoring officer from the Municipal Environment and Natural Resources Office. Once the delivery permit is approved at the checkpoint, miners can take the ore sacks to the processing plants (ball mills or CIP).

4 Descriptive statistics

4.1 The ASGM workforce

It should be noted that the composition of the workforce varies between types of mining operations , geographical areas and sometimes seasons. Figure 5 describes the different positions within the ASGM workforce in underground tunnels, which formed the bulk of our field observations.

Figure 5. The different stages in ASGM

Source: own elaboration

The first phase in a mining operation is the prospection phase. Prospection can be done in various ways, from pure 'trial and error' by relatively unexperienced adventurers, to manual inspection by skilled mineworkers, to tests in assay labs. For instance, skilled workers (*abanteros*, see below) can recognize a terrain structure in which to dig and take ore samples. These samples are manually processed and amalgamated with mercury to search for gold traces (Beverly Besmanos, subnational coordinator for Mindanao at Bantay Kita, personal communication, June, 2019). In other cases, such as Diwalwal, advanced technology is used and engineers or geologists are hired to do the prospection. In this case, ore examination is sometimes done in assay laboratories located in the area, where professional chemists analyse miners' samples (Verbrugge, Lanzano, & Libassi, 2021).

Once an area has been identified, the next step is the opening of the tunnel. 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. The tunnel owner, who may finance the operations itself or may depend on an external financier, negotiates with the landowner to obtain access. The tunnel owner may be an individual, an association of small-scale miners or a cooperative. The financier is an individual who invests in materials and technology (in small operations, these would be pick-hammers, shovels and electric hammers; in larger operations, these are drills, excavators and dynamite).

Underground, the work is managed by an operations manager or team leader, a person who usually has extensive experience in mining. This person may be trained as a technician or engineer and is usually someone the financier trusts. Additional tasks may be

given, such as overseeing the transportation of the ores to the processing plants. Security and safety workers are in charge of guarding the entrance to the tunnels. They assist in monitoring and counting ore sacks. Then there are several experts: workers with specific skills who accomplish specific tasks. Their services are called upon when needed. In each tunnel, there is also a cook in charge of preparing meals for all workers. Cooks can be women or men, depending on the situation and availability of the workers. In some cases, when there is not much work, workers from a team will take turns cooking for everyone. When the work is heavy and more efforts are required, someone from outside the team will be hired temporarily to cook for the workers. If the tunnel is close to the community, the cooking is done at the household of the cook. If not, it is done in a provisional kitchen outside the tunnel.

Figure 6. Underground miners in the midst of tunnelling operations in one of the mines of TMC in South Cotabato

Source: photo by Eugenia Robles, 2019

The bulk of the underground workforce is composed of *abanteros* and *atraseros*. *Abanteros* are in charge of digging and extracting mineral rocks. The word *abantero* is said to have derived from the Spanish word *avanzar*, which in this context means to move forward or advance, as *abanteros* are always moving forward in the tunnel. 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. Experienced *abanteros* have learned to recognize the *bina* (gold vein), which they follow underground. Once a *bina* is recognized, the tunnelling process follows its path, and drilling or digging is done according to its extension. It is easier to recognize a gold vein when the tunnel

has already been opened or in abandoned tunnels that have already been explored by large-scale mining companies (Espinoza et al., 2020).

Atraseros are ore packers and haulers that have less experience in underground mining than *abanteros*. The word *atrasero* reportedly derives from the Spanish *atrás*, which means behind, as *atraseros* are always behind the other workers, pushing the wheelbarrow or taking out the ore sacks. They first separate the rocks into high- and low-grade rocks and then move them out of the tunnel by placing them in wheelbarrows, in ore sacks or on mine trains, again depending on the scale of the operation. In some mines, packing the ore and hauling it are separate tasks. The rest of the rocks with a low mineral grade, named ore mucks (ore waste), is put aside. These ore mucks are usually sold or given to the stone washers. Stone washer will start the process of washing the ore mucks at the sluice boxes also called *banlas.*

Figure 7. Stone washer washing an ore sack with the *banlas* in the informal mining area of Agusan del Sur

Source: photo by Eugenia Robles, 2019

Stone washers are generally women, usually wives of miners, widows or single mothers who will get the ore mucks to wash in the river. 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 pans (round metal containers) to catch gold particles with a circular and gentle movement. This activity is also done by boys, who in most cases are the children of these women. For many of these boys, stone washing is their first introduction to mining. 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 some ball mills, where stone washers are sometimes hired for the final processing stage that requires a delicate circular movement to separate water from mercury in a basin.

The ore sacks are transported to the processing plants by *habal-habal*, horse or truck (in medium-scale mines). The transport is carried out by someone the financier and tunnel owner trust. This person of trust can be the operations manager or a skilled *abantero*. When the transportation is done by truck, a driver is usually assigned. Drivers can also be required to transport other sorts of material or simply fulfil any other transportation needs of the financier, manager or miners. The ball mills are generally located not too far from the mining area, close to the river for water provision. In the ball mills, ore is crushed and amalgamated with mercury. Here we find workers such as the *cargador* (ore sack hoarder), rock crusher, ball mill operator, mercury processor and, in some cases, stone washer. Some ball mills are businesses managed by entire families, involving wife and children in the processing tasks. Others are owned by financiers. The latter benefit more from the earnings of their tunnel production because they can process the ore mucks in different rounds. Ball mill owners can negotiate with financiers to divide the earnings of the multiple processing rounds. The tailings that remain after the ore has been processed by the ball mills are brought to CIP plants. The mercury amalgamation process will recover 40% of gold from the ores, while cyanidation will recover up to 60%, with both gold proceeds refined right after the smelting and/or firing process (Bantay Kita, 2012, p. 13).

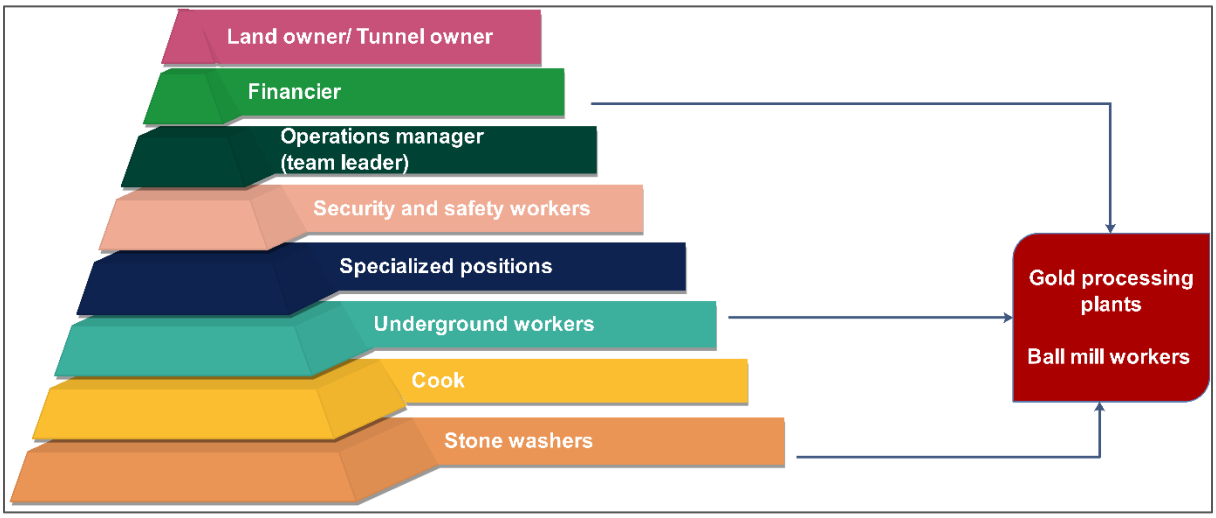
In our case study of formal mining, a land permit was obtained in negotiation with the IP leaders of *barangay* Bayugan, and the right to operate was given to FMC's miners' association. The head of FMC is the owner of all tunnels. He is the main financier and consequently receives the largest share in the production. However, he is rarely present in the mining area. The coordination and supervision of mining operations are delegated to FMC's miners' association's president and the office staff. The president is considered the right hand of FMC's main financier and supervises the mine's operation. At the time of research, this position was occupied by the nephew of FMC's main financier. The managerial staff includes professionals such as engineers, geologists and those who supervise and monitor the positions of the tunnels (mines supervisors). The administrator of FMC (in this case the wife of the president of FMC's miners' association) is in charge of managing the company's budget, salary payments and other administrative tasks. Just like in informal mines, we find security and safety workers, but here they are more numerous and include a safety officer, portal guard (guarding the entrance or portal of a tunnel), warehouse supervisor and electrical maintenance staff. At the tunnel entrance, for instance, we find a portal guard who registers workers' entry, makes sure that everyone has safety equipment and monitors what comes out of the tunnels, reducing the risk of workers stealing minerals. Other workers look after the maintenance of the tunnels. They may assist with electric maintenance, fixed roof structures or ventilation systems. Among the specialized positions we find a wide range of technicians with specific tasks, for instance drillers, blasters, bombers, timber men, welders, wreckers, skyline operators and backhoe operators. Finally, at the bottom end we have *abanteros* and *atraseros*.

Noticeable is a marked division between those positions at the high end and those at the low end of the working hierarchy. The former are characterized by more economic benefits and more power. We have visually represented this in Figure 8, which is a schematic illustration and therefore does not do full justice to the diversity on the ground. In informal mining, the high-end positions are part of what has been called an ASGM elite (Verbrugge, 2015), composed of the landowner and/or tunnel owner, the financier and team leader. The middle of the hierarchal work pyramid is reserved for those specialized positions that require specific skills. At the low end of the pyramid, we find those who have not accumulated the necessary skills to occupy a specialized position but can perform as part of the labour force. They are underground workers (*atraseros, abanteros*), those in charge of cooking and stone washers (mostly

women). In the case of formal mining, a very similar scheme is present, with the particularity of having managerial administrative staff. In this case, we observe a greater number of specialized positions occupied by professionals and/or engineers (something that also occurs in informal mining, but less frequently). Moreover, as in this type of mining there is an emphasis on employee safety, monitoring and safety positions are more abundant. Finally, the base of the pyramid is composed of underground workers (*abanteros*, *atraseros* or those who combine the latter two positions: *abantero-atraseros*).

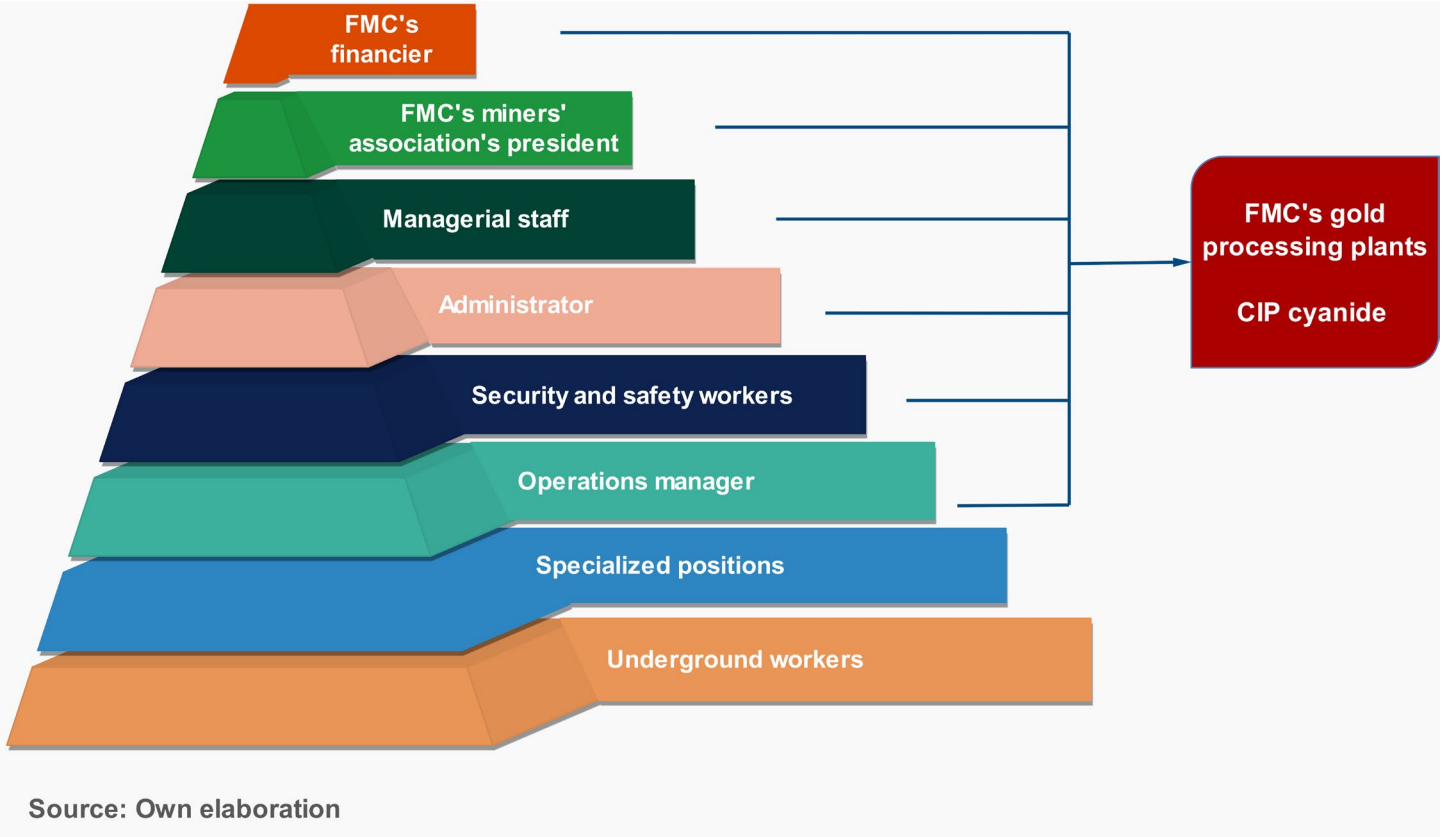
Processing labour at FMC, that is, workers in charge of gold processing, is not represented in the figure because it is treated as an activity separate from that of mineral extraction. The main contact that workers have with the processing plant in this case occurs when they load ore sacks onto the truck that will transport these sacks to the CIP cyanide plant. The processing plant belongs to FMC's president and is not free to access. Only authorized workers occupying high-end positions are allowed to enter.

Figure 8. Labour hierarchy in informal mining



Source: own elaboration

Figure 9. Labour hierarchy in formal mining



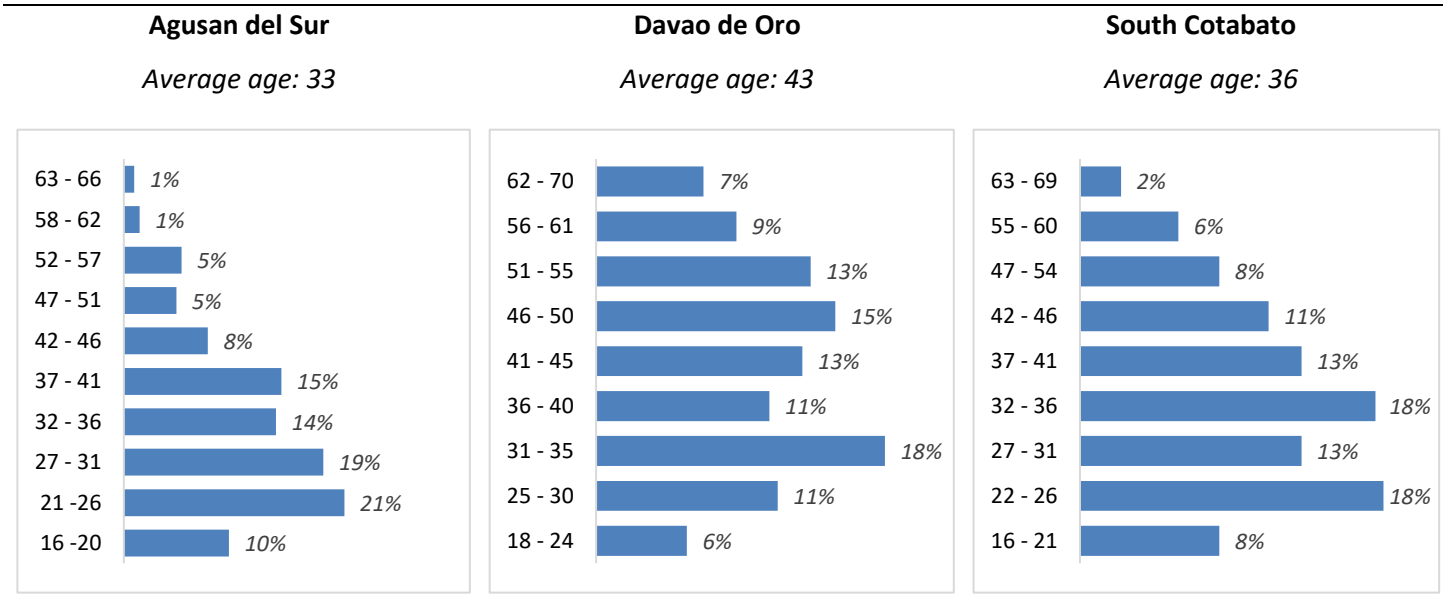
Source: own elaboration

4.2 Socio-demographic profiles

In this survey, we tried to sample men and women to show the diversity of tasks performed. From a total of 601 respondents, 535 (89.02%) were male and 66 (10.98%) female. Although underground mining is a male-dominated activity, women also perform tasks as stone washers or work at ball mill processing plants. The main tasks of stone washers are rock crushing and panning, as explained above.

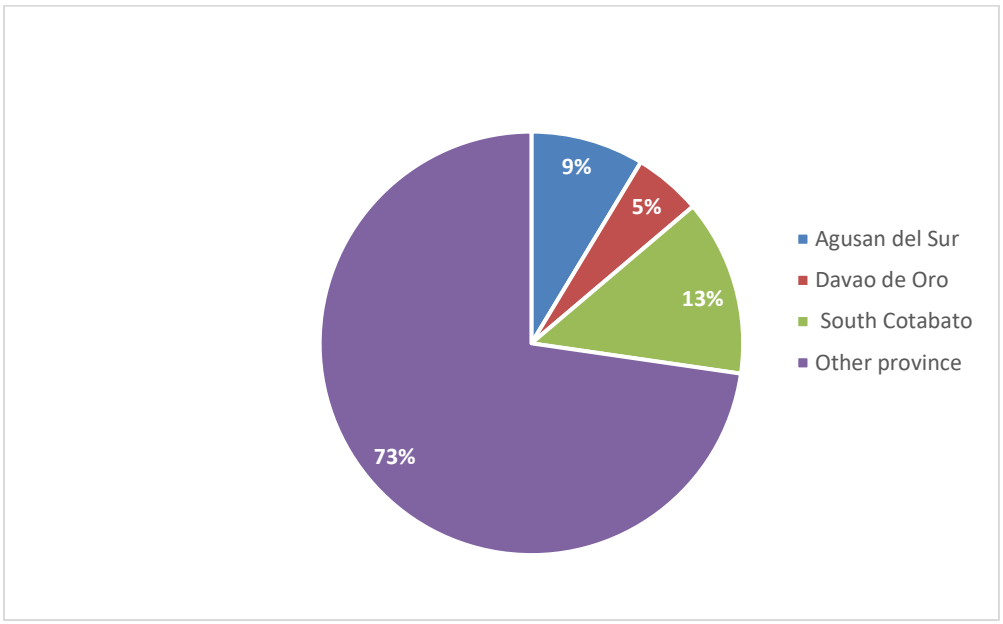
Regarding age, Figure 10 portrays ages in the three different provinces, using intervals of five years for each case. Age ranges vary according to the youngest and oldest age found in each province. Since these ages are different for each province, we decided to use intervals that reflect each province context instead of using the same intervals for them all. In Agusan del Sur, 10% of respondents fall into the youngest age group (16 to 20 years) and 1% into the oldest (63 to 66 years). The largest group in this case (21%) is between 21 and 26 years old. In Davao de Oro, the surveyed population can be considered relatively young to mature, with the largest share of respondents (18%) being between 31 and 35 years old. The youngest workers are between 18 and 24 years old (6%) and the oldest are 62 to 70 years old (7%). In South Cotabato, 8% of respondents fall into the youngest age range (16 to 21) and only 2% into the oldest (63 to 69 years). The largest number of workers is between 22 and 26 years (18%) and 32 and 36 years old (18%). Finally, the average ages for the three provinces are 33 in Agusan del Sur, 43 in Davao de Oro and 36 in South Cotabato.

Figure 10. Age distribution per province



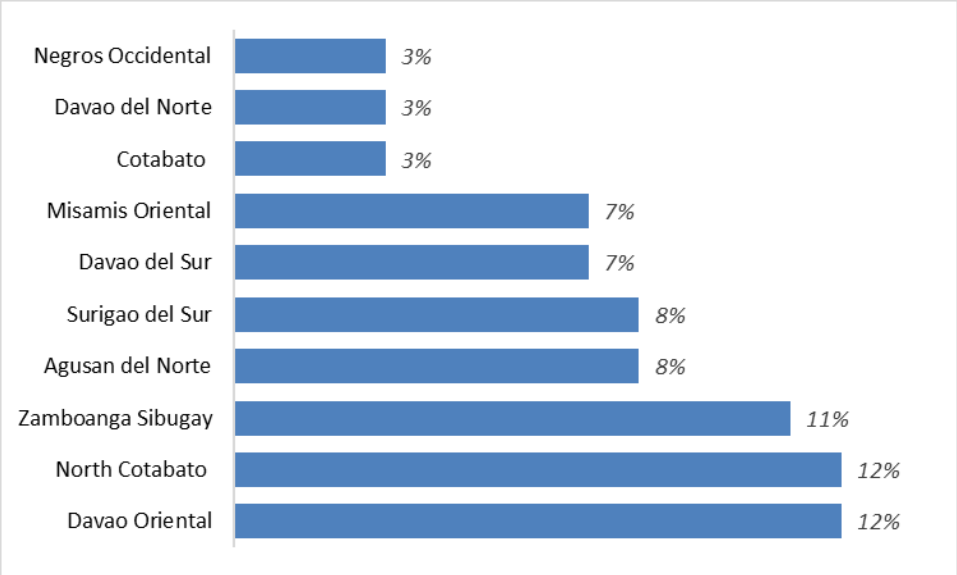
Each mining area's province has been used as a reference to calculate the rate of migration. In order to know how many respondents are migrants, three different variables were crossed: current province of employment, current province of residence and province of birth. Respondents whose choice of province was the same for these three variables are considered non-migrants. Contrarily, those who said they worked in a province different from the one they lived and were born in are considered migrants. Figure 11 shows the percentage of respondents who were born and currently live in the province where the mining area they work in is located. It can be observed that non-migrants account for 9% in Agusan del Sur, 5% in Davao de Oro and 13% in South Cotabato. On the other hand, 73% of respondents selected other provinces. Figure 12 displays the different provinces that constitute this percentage.

Figure 11. Respondents who were born and live in the same province they work in



Of those who answered 'Other province', 28% live in Agusan del Sur, 41% in Davao de Oro and 31% in South Cotabato. Figure 12 specifies the province of origin from migrants that live in Agusan del Sur

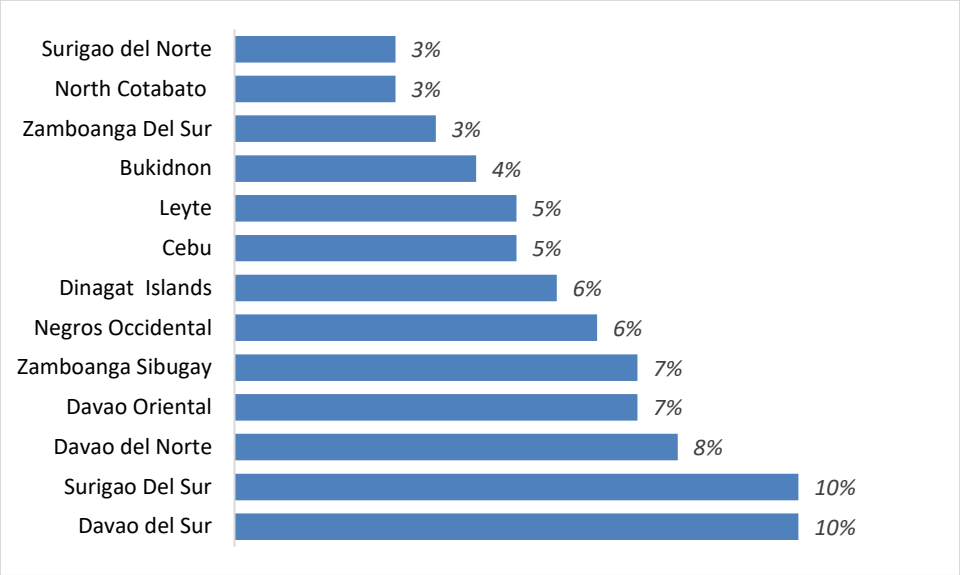
Figure 12. Breakdown of miners' provinces of origin for Agusan del Sur



In the case of the mining area in Agusan del Sur, most migrants come from Davao Oriental (12%), North Cotabato (12%) and Zamboanga Sibugay (11%). Commuting is possible from the provinces of Agusan del Norte (8%) and Davao del Norte (3%), located within driving distance (approximately two to three hours). It is likely that some of these respondents commute from these two provinces to the mining area. Yet we can only assume this possibility, as specific information on commuting was not gathered in our survey.

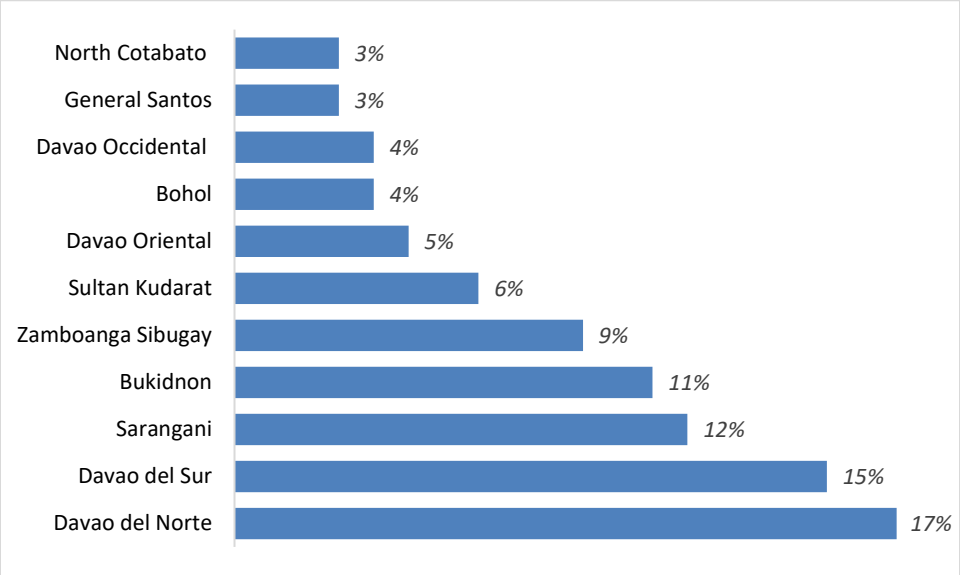
In the case of the mining area of Davao de Oro, the majority of respondents come from the provinces of Davao del Sur (10%), Surigao del Sur (10%) and Davao del Norte (8%) (see Figure 13). Commuting is possible from Davao del Norte, more specifically from Tagum city, located within a driving distance of approximately two hours. It is likely that some of these respondents commute from this city to the mining area.

Figure 13. Breakdown of miners' provinces of origin for Davao del Oro



Finally, in the case of the mining area of South Cotabato, most respondents come from the provinces of Davao del Norte (17%), Davao del Sur (15%), Sarangani (11%) and Bukidnon (11%) (see Figure 14). Commuting to this mining area is possible from General Santos, Sarangani and Koronadal City, as these provinces are located within a driving distance of approximately two to three hours.

Figure 14. Breakdown of miners' provinces of origin for South Cotabato

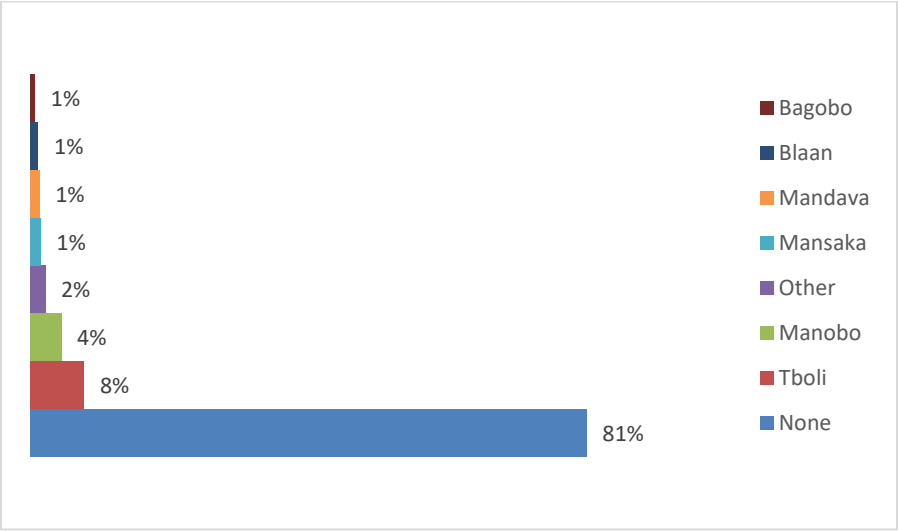


We also tried to assess respondents' mobility by asking them in how many municipalities they had lived for longer periods (minimum six months): 64% of respondents (21% in Agusan del Sur, 21% in Davao de Oro and 23% in South Cotabato) indicated having lived in only one municipality for more than six months, pointing to low levels of mobility. Moreover, 23% of respondents (8% in Agusan del Sur, 9% in Davao de Oro and 7% in South Cotabato) said they had lived in two municipalities for longer periods of time, while only 9% (3% in Agusan del Sur, 4% in Davao de Oro and 2 % in South Cotabato) lived in three or more municipalities.

In regard to belonging to an indigenous tribe, 81% of respondents declared they do not belong to any tribe. The remaining 19% belong to one of 13 tribes (see Figure 15). The most important are T'boli, Manobo, Mansaka, Mandaya and Blaan. A smaller percentage of

respondents, 11%, confirmed that their mining area is part of their ancestral domain. Interestingly, 87% of respondents did not know whether their mining area is part of an ancestral domain. However, the researched mining areas of Loring and Mavissma in Agusan del Sur and T'boli in South Cotabato are ancestral domains; this status granted them more benefits than other mining areas.

Figure 15. Share of indigenous peoples



In terms of socio-demographic background, most respondents' families engage in farming as a primary economic activity, which denotes a predominantly rural background. However, farming can be a limited option when it comes to ensuring an income. During our research, locals stated that farming was not a reliable source of income. Many of those working in farming do not work on their own land but work for different landowners. They said that payments are precarious in these cases. Additionally, harvests are unpredictable due to climate change. Hence, farming is no longer a sustainable activity for them. For this reason, mining became an important economic resource for most families in these communities.

As can be seen in Table 1, fathers are mostly self-employed (72%), meaning that they look for job opportunities in a myriad of sectors. Only 20% mentioned that they worked in the private sector.

Table 1. Father's professional status

Value	Frequency	%
Self-employed	436	72%
Work in the private sector	118	18%
Unpaid work (e.g. housework) or no work	22	4%
Work for the government (public sector)	13	2%
No response	12	2%

Most fathers have farming as their primary occupation (59%). Only 13% are miners. Another small percentage work in fishing (4%) or industry/manufacturing (3%).

Table 2. Father's primary occupation

Value	Frequency	%
Farming	356	59%
No response	106	18%
Mining	80	13%
Fishing	23	4%
Industry/ manufacturing	18	3%
*Merchant**	12	2%
Administration	4	1%
Military	2	0%

***Buy and sell specific goods, e.g. shopkeeper, selling food on the market, importing goods and selling them**

As for the mothers, a great majority (73%) of workers said that their mothers do unpaid work (housework) or no work, while 22% said that their mother works independently (see Table 3).

Table 3. Mother's professional status

Value	Frequency	%
Unpaid work (e.g. housework) or no work	440	73%
Self-employed	133	22%
Wage work in the private sector	13	2%
Work in the public sector	12	2%
No response	3	1%

Besides housework – which is often considered an 'extension' of women's duties and not work per se – farming is the second most important occupation for mothers (13%), followed by merchant (6%) and services (3%). Although mining is a predominantly male activity, women do play an important role. Finally, according to the PSA, women comprise about 25% of workers in the agricultural sector (Republic of the Philippines, 2021).

Table 4. Mother's primary occupation

Value	Frequency	%
No response	443	74%
Farming	78	13%
*Merchant**	37	6%
*Services***	15	3%
Mining	10	2%
Other	7	1%
Industry/manufacturing	5	1%

***Buy and sell specific goods, e.g. shopkeeper, selling food on the market, importing goods and selling them**

****** e.g. restaurant worker or barkeeper, taxi driver, hair dresser**

The survey results show that the majority of respondents have had access to education. More than half of our respondents has a secondary educational level (51%). More than one-third has attended primary school (38%), 5% obtained a bachelor degree and 4% did technical studies. Only 1% reported having had no education. Regarding marital status, 55% of respondents are married, 24% are single, 15% are living with a partner, 4% are divorced and 2% are widowed. Also, 24% do not have children, while two children (17%), one child (14%), three children (14%) and four children (13%) are common. Finally, 12% are taking care of children besides their own.

Roughly 14% of respondents (6% in Agusan del Sur, 4% in Davao de Oro and 4% in South Cotabato) said they had another source of income besides gold mining (see Table 5). Options available as answers to this question were farming, fishing, cattle herding, industry/manufacturing, being a merchant, working in services (i.e. barkeeper, taxi driver, hairdresser), working at religious institutions, or working in administration, education, the military and politics. Respondents in Agusan del Sur chose working in services (3%) and farming (1%), in Davao de Oro being a merchant (2%) and working in services (1%), and in South Cotabato farming (1%), being a merchant (1%) and working in services (1%). We also asked respondents what share of their overall income came from gold mining. This proved to be a difficult question to answer, resulting in a very high non-response rate (86%). Of those respondents that did answer, 8% indicated that gold mining represented 0 to 28% of their income, and only 3% said it represented between 70 and 100%. This seems to contradict the other results, which indicated that mining is an important economic activity, and the low percentage of alternative income sources mentioned. Therefore, these results on the share of gold mining in overall income should be interpreted with caution. Most respondents (75%) said that one household member directly depended on gold mining activities. Another 16% said two members and 9% said more than three members directly depended on gold mining.

Table 5. Other sources of income

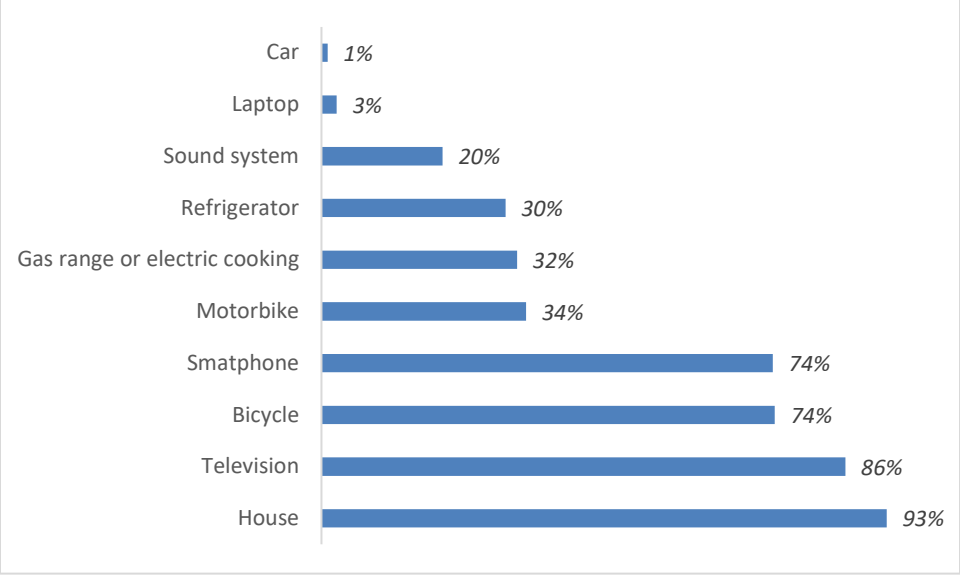
Value**	Frequency	%
Services	33	37%
Merchant	20	23%
Farming	21	22%
Other (specify)	6	7%
Administration	2	2%
Industry/manufacturing	1	1%
Fishing	1	1%
Mining (other minerals)	2	1%

4.3. Household assets

The average household size of our respondents is not very large, with 23% saying their household consists of five members, 18% of four members and 13% of six members. In the majority of households (57%), only one person contributes an income; in 25% of cases there are two contributing members and in 13% of cases there are three. This shows that most homes in these areas rely on the income of only one person, who has the responsibility of feeding and taking care of the economic needs of four to five people. In 92% of cases, mining is the first, most important income source for the household, which indicates a high dependence on ASGM. The second income source is 'services'.

With respect to the items that households own, the most frequently cited items were a house (93%), a television (86%), a bicycle (74%) and a smartphone (74%). A sound system (20%) is usually bought for karaoke sessions – a very common entertainment activity in the Philippines. A laptop (3%) and car (1%) were very scarce among the respondents (see Figure 16).

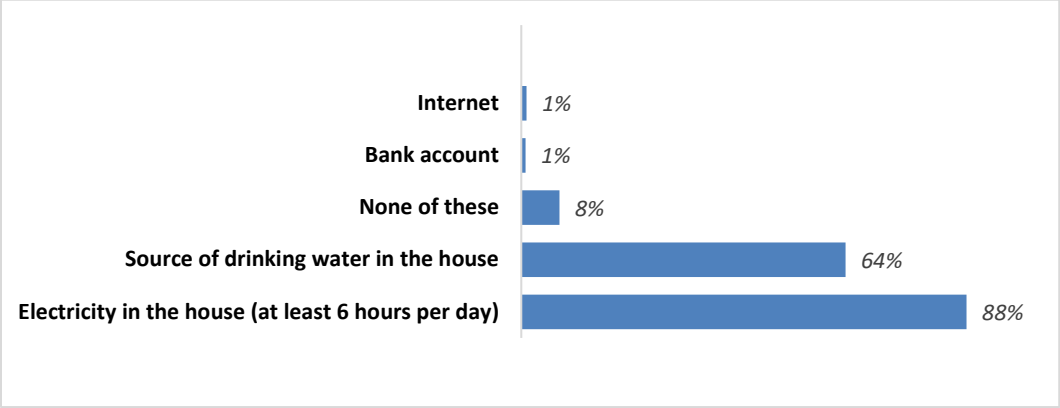
Figure 16. Items owned by the household



Regarding households' access to amenities, 88% of respondents reported having access to at least six hours of electricity a day and 64% have access to a source of drinking water in or immediately near the house. Very few people have access to a bank account or

the internet. Most respondents may have a smartphone, but access to internet is only available by loading mobile data onto these smartphones through a prepaid card (see Figure 17). It is likely that respondents understood 'access to the internet' as fixed broadband (i.e. Wi-Fi) and not as linked to mobile data. For example, when people run out of mobile data, they usually state that they 'do not have data', and that they 'need to buy a new card' instead of saying 'I do not have internet'. The connotation of the word is different in a rural context because broadband connections are scarce and most families rely on a 3G mobile network. According to a study on digital poverty, only 9.5% of Filipinos live within the serviceable scope of cell towers. In rural Mindanao, only 42% of the population has access to a 3.2 mbps mobile network (Sy, Araneta, Rahemtulla, Carrasco, & Balgos, 2021).

Figure 17. Access to amenities by the household



Only 17% of respondents said they own land. Since the range of hectares that were given by respondents was large, we separated them in quintiles. From those who owned land, 5% said they own less than 1.4 hectares, 5% owns between 1.4 and 2.85 hectares and 5% between 2.86 and 5.25 hectares. Only 2% said they own more than 5.25 hectares, with a maximum of 12. In terms of access to land, 86% of respondents said they do not have access. It is important to highlight that having access to land is not the same as owning it. Some people in the Philippines work on farmlands that are not theirs. However, our survey results seem to indicate that very few households either own or have access to land to farm.

4.4. Experience in gold mining

The majority of respondents (51%) reported that nobody taught them how to mine; they are 'self-taught'. Another 21% said that they were taught by a friend, while 14% were instructed by a relative (see Table 6). It is interesting that family members – father (7%), brother (4%) and mother (1%) – are not the first ones to introduce the majority of miners to the activity. Looking at these percentages per province, the following can be observed: while in Davao de Oro and South Cotabato, mining is a mostly self-taught activity (21% and 21%), in Agusan del Sur, most workers are introduced to mining by a friend (13%), although this number is not much higher than those who are self-taught (10%). Other relatives than those already given in the options of the question (potentially male) play a more important role in Agusan del Sur (8%) and Davao de Oro (4%). The percentage of fathers who first introduced workers to the activity is relatively low in the three provinces of South Cotabato (3%), Agusan del Sur (2%) and Davao de Oro (1%) (see Table 7). Moreover, few mothers seem to be involved in mining themselves: 1% in Agusan del Sur, 0.3% in Davao de Oro and none in South Cotabato. Generally, fewer women work in mining in the three provinces than men. In T'boli, South Cotabato, women are not allowed to work in the tunnels, and in theory, stone washers cannot perform their activity within TMC's confines. Nevertheless, several women do sack and stone washing outside TMC, in the streams of Kematu River.

Our initial hypothesis suggested that workers are introduced to mining by their father, mother and/or a relative. This could mean that mining is an inherited activity and that its knowledge is passed from one generation to another. However, the results indicate that family members do not have this primary role in all cases and that mining is less of a generational activity. Instead, most workers are self-taught. If they are introduced by someone to the activity, this is primarily a friend instead of a family member.

Table 6. Who introduced you to mining?

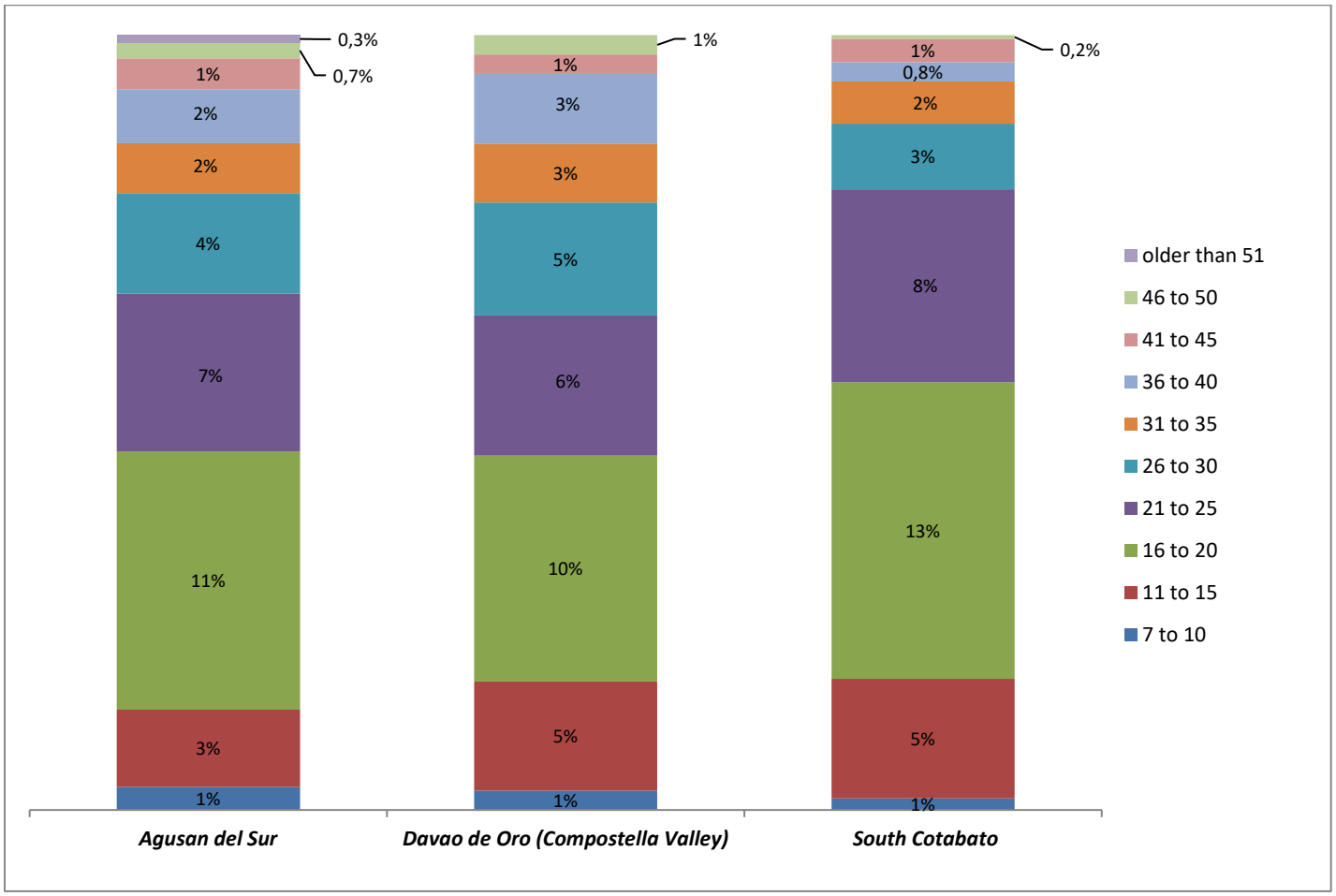
Who introduced you to mining?	Frequency	%
Self-taught	308	51%
Friend	126	21%
Other relative	87	15%
Father	39	7%
Brother	21	4%
Mother	5	1%
Brother-in-law	3	1%
Wife	3	1%
Grandfather	2	0%
Husband	2	0%
Tunnel owner	2	0%
Neighbour	1	0%
Sister	1	0%
Team leader	1	0%

Table 7. Who introduced you to mining? (per province)

Agusan del Sur			Davao de Oro			South Cotabato		
Value	**Frequency**	**%**	**Value**	**Frequency**	**%**	**Value**	**Frequency**	**%**
Friend	75	13%	*Self-taught*	125	21%	*Self-taught*	126	21%
Self-taught	57	10%	*Friend*	41	7%	*Friend*	37	6%
Other relative	47	8%	*Other relative*	22	4%	*Father*	20	3%
Father	12	2%	*Father*	7	1%	*Other relative*	18	3%
Mother	3	1%	*Mother*	2	0%	*Mother*	0	0%
Wife	3	1%	*Husband*	2	0%	*Tunnel owner*	0	0%
Tunnel owner	2	0%	*Tunnel owner*	0	0%	*Wife*	0	0%
Neighbour	1	0%	*Wife*	0	0%	*Husband*	0	0%
Team leader	1	0%	*Neighbour*	0	0%	*Neighbour*	0	0%
Husband	0	0%	*Team leader*	0	0%	*Team leader*	0	0%

Moreover, looking at Figure 18, it can be observed that the age of engagement is between 16 to 20 years for most workers (11% in Agusan del Sur, 8% in Davao de Oro and 13% in South Cotabato), followed by 21 to 25 years (7% in Agusan del Sur, 6% in Davao de Oro and 8% in South Cotabato). According to these results, 16% of workers engaged in mining activity when they were children, from ages 7 to 15 (4% in Agusan del Sur, 6% in Davao de Oro and 6% in South Cotabato).

Figure 18. At what age did you first engage in gold mining?



Since they first started gold mining, 60% of respondents have not engaged in any other activity. This seems to indicate that the extent of livelihood diversification is limited. From the 39% that have engaged in other activities, 33% have worked in different services, 23% in farming, 11% in industry/manufacturing and 10% in commerce (see Table 8).

Table 8. Activities done besides gold mining

Value	Frequency	%
Services	84	33%
Farming	57	23%
Industry/manufacturing	28	11%
Merchant	25	10%
Other (specify)	30	12%
Construction worker	8	3%
*Farming, services**	6	2%
*Merchant, services**	6	2%
Fishing	5	2%
*Farming, merchant, services**	2	1%

*since this was a multiple choice option, some respondents combined different options altogether.

In terms of mobility, more than half of respondents (51%) has worked in only one mining area. This group can be considered 'stable' workers, who have not moved places of work frequently. The following are representative percentages of stable workers: 16% *abanteros* (1% from Agusan del Sur, 7% from Davao de Oro and 8% from South Cotabato), 6% *abantero-atraseros* (1% from Agusan del Sur and 5% from South Cotabato), 5% *atraseros* (3% from Agusan del Sur and 2% from Davao de Oro) and 5% stone washers (3% from Agusan del Sur, 1% from Davao de Oro and 1% from South Cotabato).

The other half (48%) of respondents reports having worked in two to five different mining areas. We called these 'mobile' workers. In this group, the recurrent positions are: 16% *abanteros* (3% from Agusan del Sur, 4% from Davao de Oro and 9% from South Cotabato), 9% *abantero-atraseros* (3% from Agusan del Sur and 6% from South Cotabato) and 5% *atraseros* from Agusan del Sur. Other positions in this same group account for 12% in total and include backhoe operator, ball mill operator, blaster, chemical mixer, cook, driller, driver, electrical maintenance, flusher, geological mapper, inspector, mine supervisor, miner/blaster, miner/bomber, mining engineer, monitoring officer, operations manager, packer, phase guard, plumber, portal guard, sacker, safety officer, stone cage operator, stone crasher, team leader, troubleshooter, tunnel operator, underground supervisor, warehouse assistant, waste sacker and wrecker operator. This myriad of workers is not strongly represented in each province, fluctuating between 0.1 and 0.3%, with the exception of the positions of labourer (3% in Davao de Oro), sack washers (1% in Davao de Oro) and timber man (1% in Agusan del Sur). Finally, 1% of miners are highly mobile, having worked in six or more mining areas throughout their career.[5] As can be observed in our results,

[5] We defined the mining area as the smallest administrative unit where the mine is located (e.g. village, *barangay*).

an important percentage of mobile workers is composed of those at the low end of the hierarchy (*abantero*, *atrasero*). This is not surprising, as these workers are usually looking for new mines to operate in once tunnels have exhausted their extractive potential. However, the percentage of workers with more specific skills (12%) should not be overlooked. Most of these skills are usually acquired over time, which increases the value of having these types of workers on board. Moving up the hierarchy ladder takes effort and experience; thus, it is logical that the percentage representing these workers is low.

We also asked our respondents about the use of technology. It is interesting that 46% of respondents said that they have not used any machine or technology in the course of their careers. It is likely that respondents interpreted 'technology' to mean more sophisticated machines and not necessarily the type of machinery they have had access to in the course of their careers. On the other hand, the most frequently used tools are manual tools such as the pick-hammer (used by 20%) and hammer (11%). Among the machines, the wrecker was used by 3%, the rock and electric drill by 2% and the mucking machine by 2%. Other machines were mentioned by just a handful of respondents, such as the chainsaw, shovel and wagon, sledgehammer or compressor. When asked how they learned how to use these machines/technologies, respondents said that they were self-taught (50%) or a friend (16%) or co-worker (5%) taught them (see Table 9).

Table 9. Use of machines and technologies

Value	Frequency	%
None	276	46%
Pick-hammer	120	20%
Hammer	68	11%
Wrecker machine	15	3%
Rock drill and electric drill	14	2%
*Electric and rock drill, mucking machine**	11	2%
Banlas*/sack washer*	9	2%
Rock drill and pick-hammer	8	1%
Sluice box	8	1%
Mallet	7	1%
Stone washing	7	1%
Welding machine	6	1%

*since this was a multiple choice option, some respondents combined different options altogether.

The great majority of respondents (95%) stated that they never received any type of formal training. From the 4% who did, 11% took a course in first aid and safety organized by a mining company (PSMC) located in Agusan del Sur. This mining company is well known in the area and has had training courses exchanges with FMC – the formal mining company included in this research – in Agusan del Sur. Other courses were organized by PSMC as well (labour and employment, or mining) and by the Mines and Geosciences Bureau (training in how to operate explosive devices, safety and first-aid training).

Figure 19. Chisel and hammer are among the most frequently mentioned tools by workers in this survey. In this image, a miner makes use of both tools while accumulating sacks of ore in the narrowness of the tunnel

Source: photo by Eugenia Robles, 2019

Most respondents (98.5%) are not members of a labour union. However, from the five respondents who said they are (0.8%), all scored their satisfaction with a 5, which means 'very satisfied'. Reasons for this vary from 'we are united' to 'the association really helps a lot' and 'the association has given some privileges to us'. Surprisingly, an incredibly low number of respondents said that they belong to a cooperative or association (four belong to FMC in Agusan del Sur and one to TMC in South Cotabato), although this is compulsory under Philippine mining law. Their level of satisfaction is similar, being 'very satisfied' (score of 5) and 'satisfied' (score of 4). This indicates that the percentage of miners who belong to an association is extremely low but that belonging to one seems to pay off. In an open question, we asked respondents why they do not belong to a union or cooperative. Most workers answered that they are not aware of any union or association and that nobody had asked them to join. Some also said that unions are not allowed in the company, that they are not allowed to join one or that only financiers are included. What was observed during fieldwork is that in most cases, workers who actively participate in an association or cooperative do not perform the gruesome part of the labour. That is, the benefits of and decisions taken at this level are accessible to 'elites' only.

4.5. Organization of work in the mine

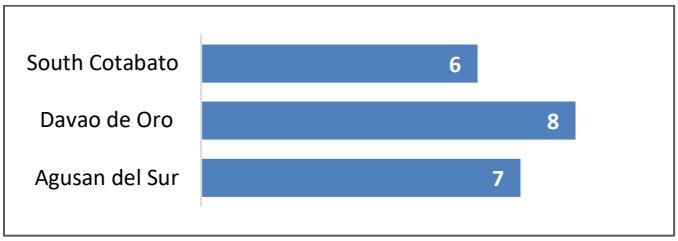
We included a multiple-choice question asking respondents about the position they occupied in the mine. The list of choices contained the most common positions, yet a significant share of our respondents (38%) ticked the option 'other'. These other positions include backhoe operator, ball mill operator, blaster, chemical mixer, cook, driller, driver, electrical maintenance worker, flusher, geological

mapper, inspector, mine supervisor, miner/blaster, miner/bomber, mining engineer, monitoring officer, operations manager, packer, phase guard, plumber, portal guard, sacker, safety officer, stone cage operator, stone crasher, team leader, troubleshooter, tunnel operator, underground supervisor, warehouse assistant, waste sacker and wrecker operator. This indicates that the variety of positions is extremely high. It should be noted that all these positions are related to underground mining. If we were to visit other types of operations, we would find yet many other types of jobs.

The positions selected from the multiple choices break down as follows: 32% of respondents said they are *abanteros* (4% in Agusan del Sur, 11% in Davao de Oro and 18% in South Cotabato), 16% were *abantero-atraseros* (4% in Agusan del Sur and 11% in South Cotabato), 10% *atraseros* (8% in Agusan del Sur and 2% in Davao de Oro), 2% portal guards, 1% team leaders, 1% cooks and 0.3% drivers. As a reminder, our sample was not representative, but we tried to sample proportionally based on rough estimates of the number of workers in the different categories. When asked whether they had occupied other positions in the past, 80% respondents said they did not, versus 20% who did. The past positions occupied were *atrasero* (8%), *abantero* (7%), other (4%), *abantero-atrasero* (1%), team leader (1%), portal guard (1%) and cook (0.3%). We can assume that those who did occupy other positions in the past acquired skills over time and made a 'career' in mining. Yet if we look at the overall percentage, this is a small group in our sample. It seems to indicate that mobility within the sector is limited.

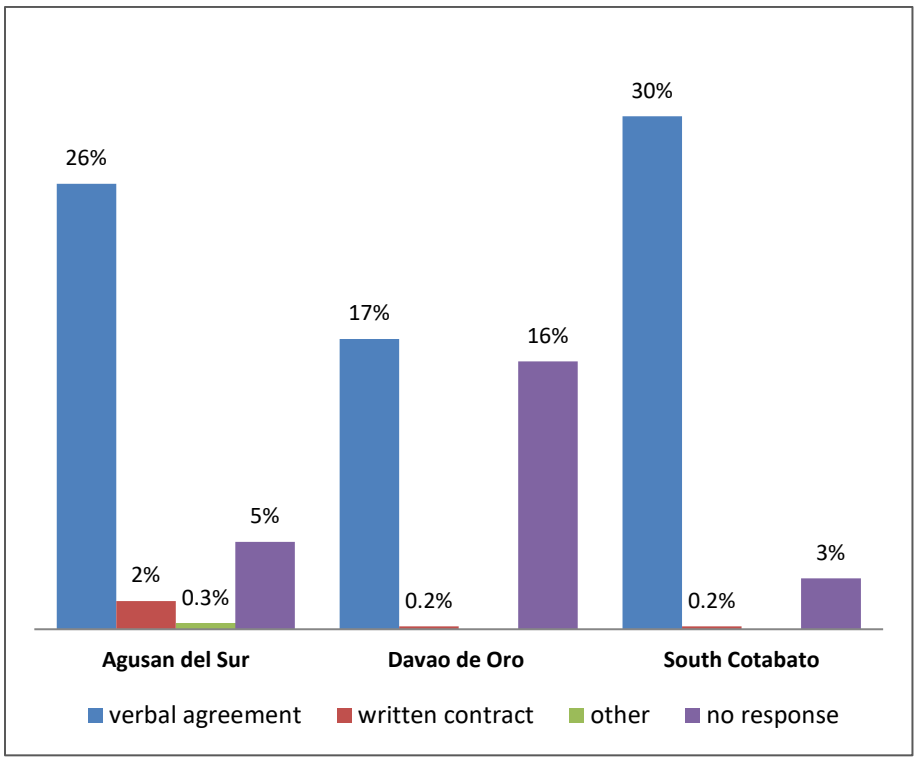
Regarding teamwork, 76% of respondents said they work in a team, against 24% who work independently. Those miners working in a team, locally called a *corpo*, were asked how many workers their team had. The majority (39%) said that their team was composed of three to five workers, while over a third (32%) had a team with six to 10 members, 12% were part of a team composed of 11 to 15 workers and 7% of a team of 16 to 20 workers. The average number of workers per *corpo* in each province was 7.2 in Agusan del Sur, 8.4 in Davao de Oro and 6.2 in South Cotabato (see Figure 20).

Figure 20. Average number of workers per *corpo* (team)



Asked how they were contracted, 74% said this occurred through a verbal agreement (26% in Agusan del Sur, 17% in Davao de Oro and 30% in South Cotabato) and 2% stated they have a written contract. The rest did not respond (24%) or chose the option 'other' (0.3%) (see Figure 21).

Figure 21. How did you get contracted for this mine?



Ways of recruitment are as follows (see Table 10): 35% of respondents said they applied spontaneously to work in the mining area, with half of these working in South Cotabato (16%). Another 24% did not respond to the question, and 20% said they had been asked by a relative or someone else (19%). Others said they saw an advertisement for the job (2%) (see Table 10). As the results show, most workers apply for the job spontaneously. Since mining – and specifically ASGM – is an uncertain activity, workers usually find themselves on the lookout for jobs by approaching different mining areas or through contacts that are already working in these areas. While it is known that kinship relations can be important for gaining access to the mines, these data suggest that they are certainly not the most important. Contact with friends or other workers is also a way to find out about new job opportunities. Nowadays, job announcements are usually made via social media, via Facebook or text messages, and also word of mouth.

Table 10. How were you recruited for this mine?

Responses	Agusan del Sur	Davao de Oro	South Cotabato	Total
I was asked by a relative	7%	4%	9%	20%
I was asked by someone else	10%	4%	5%	19%
I saw an announcement	1%	0%	0%	2%
I applied spontaneously	11%	9%	16%	35%
Other	0%	0%	0%	1%
No response	5%	16%	3%	24%

In terms of the relationships within a team, the vast majority of respondents (88%) rated their relationships with other workers as very good (5). Another 12% scored them as good (4) and 0.9% as rather good (3). Only two respondents rated them as bad or very bad. This positive finding is reinforced by the answers to the question, 'how often do conflicts between team members occur'? Here, 70% of respondents said they never occur, while 5% said they are rather rare. Only 1% respondents said they occur very often. As a consequence, the follow-up questions about the causes of these conflicts received insufficient responses and will not be presented here. We also asked about conflict resolution paths, and 38 respondents said conflicts are resolved by reconciliation. Only one respondent highlighted the role of a labour union or association in conflict resolution.

Figure 22. A *corpo* (team) of miners during their break in South Cotabato

Source: photo by Eugenia Robles, 2019

Finally, to address the issue of conflicts between the financier and the team, we asked how many workers work for a financier. In response, 70% of respondents said they do (29% in Agusan del Sur, 12% in Davao de Oro and 30% in South Cotabato). However, 70% respondents said conflicts never occur, while only 0.3% said they are rather rare.

Overall, it can be observed that conflicts are rarely present in mining. Specifically for the case of financiers, we expected that conflicts over revenue-sharing were frequent, since financiers are known to take larger shares than the low-end workers. However, our qualitative data show that workers do not complain about conflicts within their working environment, nor about financiers. For example, when asked how relationships with others are and whether there are conflicts, one of our respondents said:

No, nothing at all… quarrelling is not good (abantero, personal communication, June 2019).

Moreover, many workers consider their team to be a family, and in some cases they work among family members. If any complaints about the relationship with financiers were made, most revolved around the difficulty of the work and the lack of safety in the mine (this will be discussed in the following section); they rarely referred to the relationship with the team or conflicts within the team.

4.6. Working conditions

Regarding their work schedule, 66% of our respondents mentioned that they have a regular schedule, versus 35% who said they do not. Of those who have an irregular schedule, 31% work six hours a day, 24% eight hours, and 20% 12 hours. Moreover, those with a regular schedule reported working between one (seven respondents) and seven days (40 respondents) a week, with most working six (45%) or five days a week (25%).

ASGM is known to be a hazardous activity with a general disregard for health and safety measures (World Bank, 2020). However, a large majority of respondents (82%) reported that accidents never occur in the mining area they working in, while 13% said they occur occasionally and only 4% said they happen very often (see Table 11).

Table 11. Accidents

Occurrence of accidents	Frequency	%
Never	492	82%
Occasionally	76	13%
Very often	22	4%
Often	8	1%
From time to time	3	1%

This may be explained by the fact that these workers consider accidents to be part of the work and thus minimize their relevance. This perception was encountered several times during interviews and conversations with workers. Having to deal with rock falls or accidents that could harm people physically seemed to be underestimated as long as the income was good. For instance, interviews with miners in the informal mine of Agusan del Sur and Davao de Oro revealed the following:

- *Interviewer: What are the challenges and difficulties you experience here in your work?*
- *Miner: compared to before? I feel ok here.*
- *I: Even if you soak in the water the whole day?*
- *M: Yes, it's better here. I don't consider it difficult; it's ok, the income is ok.*

(Abantero/atrasero, personal communication, Agusan del Sur, May 2019)

- Interviewer: What are the challenges and difficulties you experience working here?

- *Abantero: Mining is hard. The work is so heavy, the tunnel is sometimes scary, but we are all used to it. Most scary thing is if we don't have an income; we also get sick. Or when we also experience orders for closure, close the operation.*
- *I: Do they bring police or soldiers here?*
- *A: No, we don't see any police, but we are just told, no operation, no work, no income.*

(Abantero, personal communication, Davao de Oro, June 2019)

- *Interviewer: Have you experienced accidents?*
- *Atrasero: None so far.*
- *I: What about your team?*
- *A: From the grace of God no, none at all.*
- *I: Have you observed accidents happening to others?*
- *A: No.*
- *I: How about illness experienced, have you been sick because of your work?*
- *A: Sometimes fever, body pain/aches.*
- *I: What about the lungs because of the dust?*
- *A: no, none so far.*

(Atrasero, personal communication, Agusan del Sur, June 2019)

In these responses, it can be observed that for some workers, accidents represent a problem, but they are not the most relevant issue. Most miners adjust to these hazards because they have no choice but to do so. As our interviewee mentioned, 'we are all used to it'. During field research, it was perceived that although accidents could occur, miners did not complain strongly about them. Other problems were more important, such as orders for closure, which have a direct effect on income. On the other hand, it was seen that some respondents could not clearly distinguish an accident from disease or a crime. Some respondents specified a disease or 'victim of a firearm' as a common accident (see Table 12).

Furthermore, only one accident occurred in the year prior to the survey according to 12% of respondents, although 1% of respondents from Davao de Oro (all workers in the same mine in Diwalwal) reported that there had been 20 accidents. In terms of deaths, 92% of respondents said there had been no deaths and 3% reported one death (1% in Agusan del Sur, 1% in Davao de Oro and 1% in South Cotabato). On the other hand, 1% of respondents in Davao de Oro reported 20 or 50 deaths. As mentioned, the mining area of Diwalwal in Davao de Oro is very volatile because of its history of a gold rush and violent confrontations. In this area, accidents and deaths seem to occur at a higher frequency than in the other areas of our research. This may explain the higher rates of accidents and deaths according to respondents from this area.

Since many respondents said accidents do not occur, the response rates for the follow-up questions asking about the most common types of accidents are low as well. The possible answers to the multiple-choice question were 'floods', 'landslides', 'fall', 'accident with a machine', 'suffocation', 'cave-ins', and 'other'. Answers recorded with the option 'other' were coded as follows: 'rocks falling on my head and body', 'accident with a mining cart', 'electrical problem', 'victim of a firearm'. The most common accidents according to

respondents are cave-ins, mentioned by 16% (8% in Agusan del Sur, 6% in Davao de Oro and 2% in South Cotabato), followed by suffocation (5%) and rocks falling from above (2%) (see Table 12).

Table 12. What types of accidents are most common?

Types of accidents	Agusan del Sur	Davao de Oro	South Cotabato	Total
Cave-ins	8%	6%	2%	16%
Suffocation	2%	3%	0%	5%
Accident with a mining cart	0%	0%	0%	0%
Landslide	1%	0%	0%	1%
Disease	0%	0%	0%	0%
Electrical problem	0%	0%	0%	0%
Rocks falling from above	2%	0%	0%	2%
Tuberculosis	0%	0%	0%	0%
Victim of a firearm	0%	0%	0%	0%
No response	21%	24%	31%	76%

Cave-ins may occur because of dynamite explosions or the drilling of the tunnel. Only one of the mining areas visited for this research, namely FMC, had employed anti-collapse measures, which protect miners from these kinds of accidents. According to workers in FMC, an anti-collapse structure differs from a usual timber structure in that it uses a concrete cover all over the roof, whereas timber is a wood structure that deteriorates over time and through humidity.

Suffocation can occur in the depths of the tunnels. Usually, a machine provides ventilation and facilitates air movement in the tunnels, avoiding oxygen depletion. However, this ventilation can fail, and if workers are several hundreds of metres inside the tunnel, they can suffocate. Moreover, suffocation also occurs as a result of gas emissions, mineral dust or the oxidation of timber. Although suffocation is the second most common cause of accidents, its occurrence is still relatively rare. The mining areas we researched have installed ventilation systems inside their tunnels through pipelines that work properly as long as electric power is provided via generators. These machines have to be maintained and cleaned once a week in order to ensure their proper functioning. It is likely that suffocation accidents occurred when such machines did not work properly.

Accidents with mining carts occur because of the speed at which these carts are moved inside the mine. They are often loaded with heavy rocks that can hit and injure workers.

Finally, landslides in the Philippines are common due to the geography and weather of the country. This is especially the case in mining areas located in tropical mountain terrain, such as the areas under study. Landslides can occur because of rainfall caused by monsoons or tropical cyclones or because of a badly calculated undercut that corrodes the soil.

It is important to note that some respondents mention diseases as accidents. As explained above, this indicates that many workers have normalized the risks of their work, making it difficult for them to distinguish what can be considered an accident in the workplace.

We also asked our respondents whether they had experienced an accident themselves. Their answers seem to confirm the low numbers presented above, and there was a relatively high response rate (14% did not respond): 80% said they had never experienced an accident.

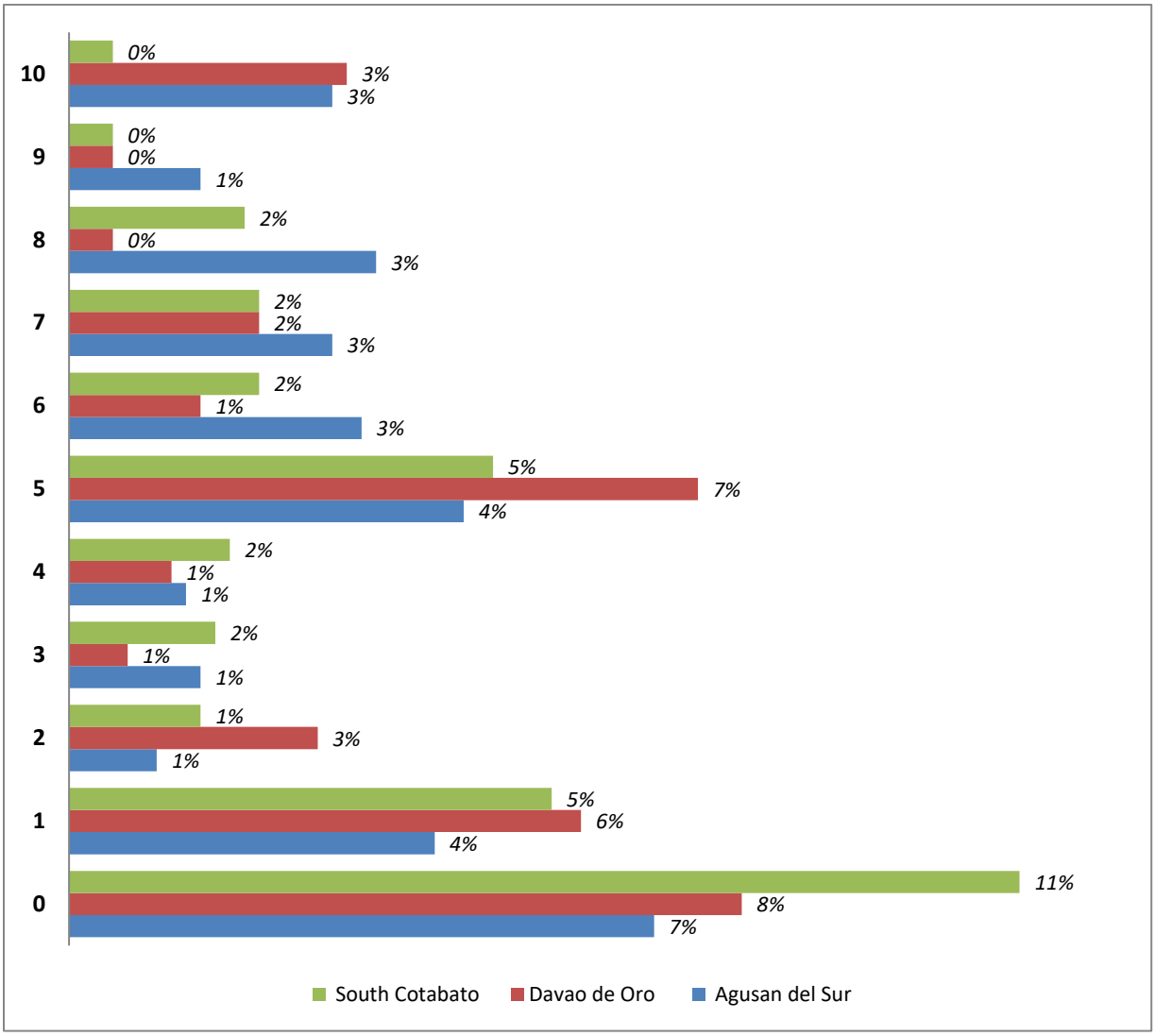
We asked workers whether they feel worried about their health and safety in the mine (0 is never worried, 5 is neutral and, 10 is always worried). Results show that 25% are never worried (7% in Agusan del Sur, 8% in Davao de Oro and 10.8% in South Cotabato), whereas 7% are always worried, mostly in Agusan del Sur (3%) and Davao de Oro (3%). The difference with South Cotabato (1%) might be due to the way in which the mines of TMC have been secured in order to reduce risks. Because of its partnership with a large-scale private company, TMC implemented safety and health standards to obtain the ISO 45001:2018 on Safety in 2018. This implies better infrastructure inside the tunnels. However, not all mines received this benefit. Since TMC's partnership is mixed, the area covered by the large-scale company (4 km^2) is where standards have improved, but other tunnels outside this domain still struggle to obtain better infrastructure. Nevertheless, risks have been reduced for some workers who benefit from these measures.

Table 13. Do you ever feel worried regarding safety? (per province)*

Level of safety (0-low to 10-high)**	Agusan del Sur	Davao de Oro	South Cotabato	Total
0	7%	8%	11%	25%
1	4%	6%	6%	16%
2	1%	3%	2%	5%
3	2%	1%	2%	4%
4	1%	1%	2%	4%
5	5%	7%	5%	17%
6	3%	2%	2%	7%
7	3%	2%	2%	7%
8	4%	1%	2%	6%
9	2%	1%	1%	3%
10	3%	3%	1%	7%

***0 is never worried, 5 is neutral and, 10 is always worried**

Figure 23. Do you ever feel worried regarding safety? (per province)*



***0 is never worried, 5 is neutral and, 10 is always worried**

We used an open question to inquire about the reasons for respondents' scores regarding safety. More than one third respondents, 36% (9% in Agusan del Sur, 9% in Davao de Oro and 17% in South Cotabato) said the tunnels are safe. It can be noted that once again, the percentage is higher for South Cotabato, which has upgraded its safety and health standards. In contrast, 25% of respondents said they are worried because accidents happen all the time (9.5% in Agusan del Sur, 10% in Davao de Oro and 5.3% in South Cotabato). Again, South Cotabato has the lowest percentage of workers worried about risk. Some respondents also expressed more specific concerns, for example about the quality of the timber support structures inside the tunnels. Moreover, 6% of respondents connected risk to their own responsibility by mentioning: 'I do not worry because I am careful'. Respondents who worked above ground also advanced this as a reason not to be worried. Clearly, underground activities are perceived as being the most dangerous. The response 'other' includes a wide variety of answers that could not be coded because of their specificity.

Table 14. Reasons for (not) being worried about safety

Responses*	Agusan del Sur	Davao de Oro	South Cotabato	Total
Worried about uncertainty inside the tunnel, accidents happen all the time	10%	10%	5%	25%
Worried about washing stones outside	1%	1%	0%	2%
Worried because there are no safety measures	1%	0%	0%	1%
Worried because there is no safety gear	2%	1%	0%	3%
Worried about the structure of the tunnel. Timber in bad condition	2%	1%	3%	7%
Worried about having a landslide	0%	0%	1%	1%
Worried about a tunnel collapse	0%	1%	1%	2%
Worried about heavy rains, floods	1%	0%	0%	1%
I do not worry, because the tunnel is safe	9%	9%	17%	36%
I do not worry, because I'm careful	1%	2%	2%	6%
Worried about chemical exposure	1%	0%	0%	1%
I do not worry, because my work is outside the tunnel	1%	4%	0%	5%
Not worried because if the tunnel is unsafe, we do not enter	0%	1%	0%	1%
Other	3%	0%	2%	6%
No response	1%	1%	0 %	1%

***Note: This is an open question that was coded for its interpretation**

Next, we asked the workers what they think can and should be done to improve safety in the mines. Respondents' answers to this open question were codified (see Table 15). The great majority (41%) thought that accidents are imminent, thus it is up to them to take responsibility for how to conduct themselves in the mines in order to avoid these risks. The answer 'be careful, pray and wear gear' adds a religious element to this. Moreover, another 4% signalled that praying is the only way to avoid accidents. According to the 2015 census (the most recent) conducted by the PSA, 79.5% of the population is Roman Catholic and 9% belongs to other Christian groups, while 6% is Muslim (Philippines Statistics Authority, 2017) . Another 26% of respondents think they should maintain a solid structure in the mines, referring mostly to the tunnel roofs. Last, 9% did not respond, and 5% think that they should follow safety measures. Most of these responses assign responsibility to the worker. Only a very small number, 1% (five respondents), mentioned that financiers should buy and provide safety gear. Moreover, knowledge about safety measures was perceived as not being widespread among workers. Workers always expect difficult working conditions when entering the tunnels.

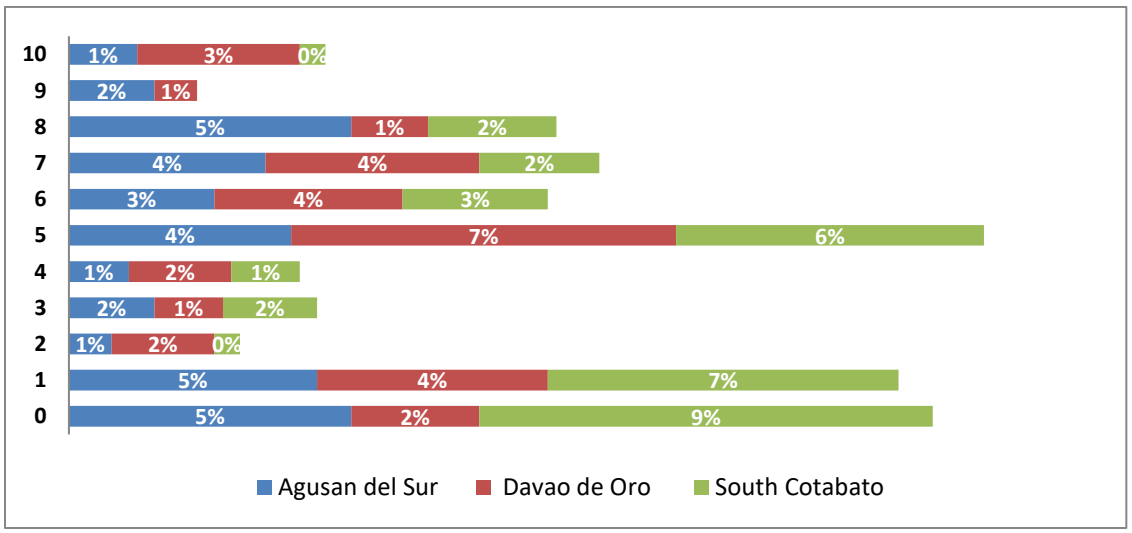
Table 15. Improving safety

Responses*	Frequency	%
Be careful, pray and wear gear	249	41%
No response	156	26%
Keep the structure of the mine in good condition	58	10%
Pray	33	6%
Follow safety measures	24	4%
Keep calm, stay positive	20	3%
Do regular monitoring of the tunnel	9	2%
Everything is good for me, no changes needed	9	2%
We do not enter if there's bad weather (rain)	6	1%
Nothing can be done; we have no choice	6	1%
Financiers should buy safety gear	5	1%
No idea	5	1%
Other	21	4%

***Note: This is an open question that was coded for its interpretation**

Only 536 respondents answered our question about health. We gave them the scale of 0 to 10, where 0 is never worried, 5 is neutral and, 10 is always worried. From the 536 respondents, 18% gave a score of 5, (4% in Agusan del Sur, 8% in Davao de Oro and 6% in South Cotabato). A slightly smaller group (17%) said that they are never worried (6% in Agusan del Sur, 3% in Davao de Oro and 9% in South Cotabato) and another 16% gave a score of 1 (5% in Agusan del Sur, 5% in Davao de Oro and 7% in South Cotabato), which can be interpreted as 'little worried'. It can be observed once again that workers from South Cotabato continue to have fewer concerns than those in the other mining areas. Moreover, it seems that health risks are more serious in Davao de Oro. On the other hand, only 5% (1% in Agusan del Sur, 3% in Davao de Oro and 1% in South Cotabato) mentioned that they are always worried (score of 10) about their health. We asked about the reasons for these answers in an open question and again codified the answers (see Table 16). While many workers (39%) did not respond to this question, 13.3% mentioned that they are not worried because they do not get sick and feel they are in good health. Similarly, 7% said they are not worried because it is normal to get sick and one cannot avoid it. On the other hand, 7% said that they worry about their health because they have a lot of work and the work is physically very demanding. Finally, 5% said they are worried because of exposure to chemicals (mercury).

Figure 24. Worries about health*



***0 is never worried, 10 is always worried**

Table 16. Reasons for (not) being worried about health

Responses*	Frequency	%
No response	236	39%
I didn't get sick/am in good health	80	13%
It's normal to get sick/can't avoid it	41	7%
Overwork/loads of work	40	7%
Exposure to chemicals (mercury)	28	5%
Poor ventilation	22	4%
My body is always wet inside the tunnel	22	4%
Body/back pain	19	3%
There's bacteria inside the tunnel	18	3%
It doesn't matter, I have to endure it	18	3%
Not worried, I got used to it	17	3%
Other	17	3%
I'm already sick (asthma, cough, fever, weakness)	13	2%
Not worried, the chemicals are not processed in the community	10	2%
No health insurance	6	1%
Not worried, we are checked twice a year/have Philippine health insurance	6	1%
I experienced skin rashes	4	1%
Age matters	4	1%

***Note: This is an open question that was coded for its interpretation**

Again, we asked workers what, according to them, should or can be done to improve conditions affecting health in the mines (see Table 17). The non-response rate was again high (28%), while over a third of respondents assigned some responsibility to themselves: 25% said that they would take medicine, take care of their health and eat well. Another 15% mentioned that they would take some rest, and 5% said they would be careful and alert. However, other respondents thought that it would be a good idea to have new technologies that can improve mining operations and reduce miners' exposure to situations that put their health at risk or to receive the benefits of health insurance (7%). Other respondents thought it would be important to be monitored and have regular and free health check-ups (3%). A smaller number of respondents thought about work-related measures. For instance, 2% said that ventilation inside the tunnel should be improved; 1% thought it would be good to have alternatives to mercury. Another 1% mentioned that it would be advisable to create a modern system to lift miners in and out of the tunnels. The tunnelling structure is often not wide enough for miners to access its depths comfortably. Frequently, the space is so narrow that they have to crouch down.

Table 17. Improving health

Responses	Frequency	%
No response	166	28%
Take medicine/take care of the body and health/eat well	149	25%
Take some rest	90	15%
Provision of new technologies and health insurance	42	7%
Be careful/be alert	27	5%
Be monitored/receive check-ups for free	20	3%
Take care of the workers/community	17	3%
Other	15	3%
Improve ventilation inside the tunnel	14	2%
Pray	11	2%
Wear protection gear properly	10	2%
Nothing/no idea	9	2%
Create a modern way to lift miners in and out of the tunnel	8	1%
Have an alternative to mercury	8	1%
Get treatment	5	1%
Drink alcohol responsibly/do not drink alcohol	4	1%
Take extra clothes	4	1%
Get another job	2	0%

In addition to asking about their own and their colleagues' health, we also asked respondents whether they sometimes worry about the impact of mining on their family members' health or on the health of surrounding communities. We can see in Table 18 that 30% of respondents said they are never worried (10% in Agusan del Sur, 8% in Davao de Oro and 12% in South Cotabato). Another 22% gave a score of 1 (9% in Agusan del Sur, 6% in Davao de Oro and 8% in South Cotabato), which we interpret as being little worried,

while 12% gave a score of 5 (2% in Agusan del Sur, 6% in Davao de Oro and 4% in South Cotabato), meaning they are somehow worried. On the contrary, only 2% mentioned they are always worried (1% in Agusan del Sur and 1% in Davao de Oro).

Figure 25. A married couple doing stone washing in the community surroundings in Agusan del Sur. Families work together near the rivers, far away from the tunnel operations

Source: photo by Eugenia Robles, 2019

More than half of those surveyed (54%) did not respond to the question about their reasons for (not) being worried about how mining affects the health of their family or community. Of the remaining respondents, 15% mentioned that they are not worried because 'the mine is far away from my family'. Adding to this, 2% said that 'mining has nothing to do with [their] families' and 1% that 'processing of ores is not done inside the community'. Moreover, 5% said that miners and their families are in good health and 2% that they 'have no choice', that being sick is something 'that cannot be avoided', and that 'it is normal to get sick'. On the contrary, 7% said they are worried because the whole area is prone to landslides, earthquakes and other natural disasters, and 5% is worried because there is environmental pollution due to chemicals (mercury and cyanide). Another 1% mentioned that many miners have lung and asthma problems, and 1% said that there are children with tuberculosis. Finally, 1% expressed a lack of interest, stating they do not discuss or think about health, and another 1% mentioned they have no idea about their health condition.

Table 18. Worries about family and community health

Level of concern (0-low to 10-high)*	Agusan del Sur	Davao de Oro	South Cotabato	Total
0	10%	8%	12%	30%
1	9%	6%	8%	22%
2	4%	0%	1%	5%
3	2%	1%	2%	5%
4	0%	3%	2%	5%
5	2%	6%	4%	12%
6	0%	3%	2%	6%
7	3%	3%	1%	8%
8	1%	0%	1%	2%
9	1%	0%	0%	1%
10	1%	1%	0%	2%

***0 is never worried, 10 is always worried**

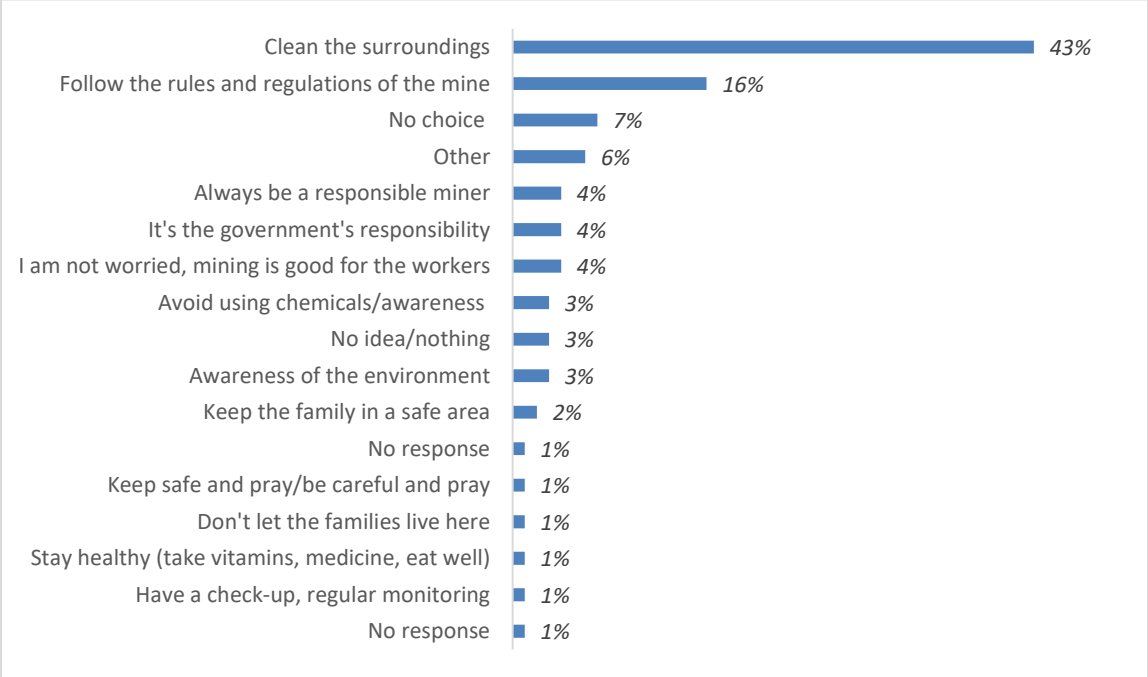
Table 19. Reasons for (not) being worried about family and community health

Response	Frequency	%
No response	324	54%
Others	92	15%
I have no idea	40	7%
I have health benefits	31	5%
We have no choice/can't avoid it/it's normal to get sick	29	5%
Family got used to living in the area	15	3%
We don't discuss it/ don't think about it	13	2%
Mining in environmentally friendly ways/responsible mining	9	2%
There are children and people with tuberculosis	9	2%
Miners and their families are in good health so far	8	1%
Because many miners have lung problems or asthma	7	1%
There's no processing inside the community	7	1%
Environmental pollution due to chemicals (mercury, cyanide)	6	1%
The whole area is prone to landslides, earthquakes, many risks	5	1%
Because the mine is far away from my family	4	1%
Mining has nothing to do with my family	2	0%

*** Note: This is an open question that was coded for its interpretation**

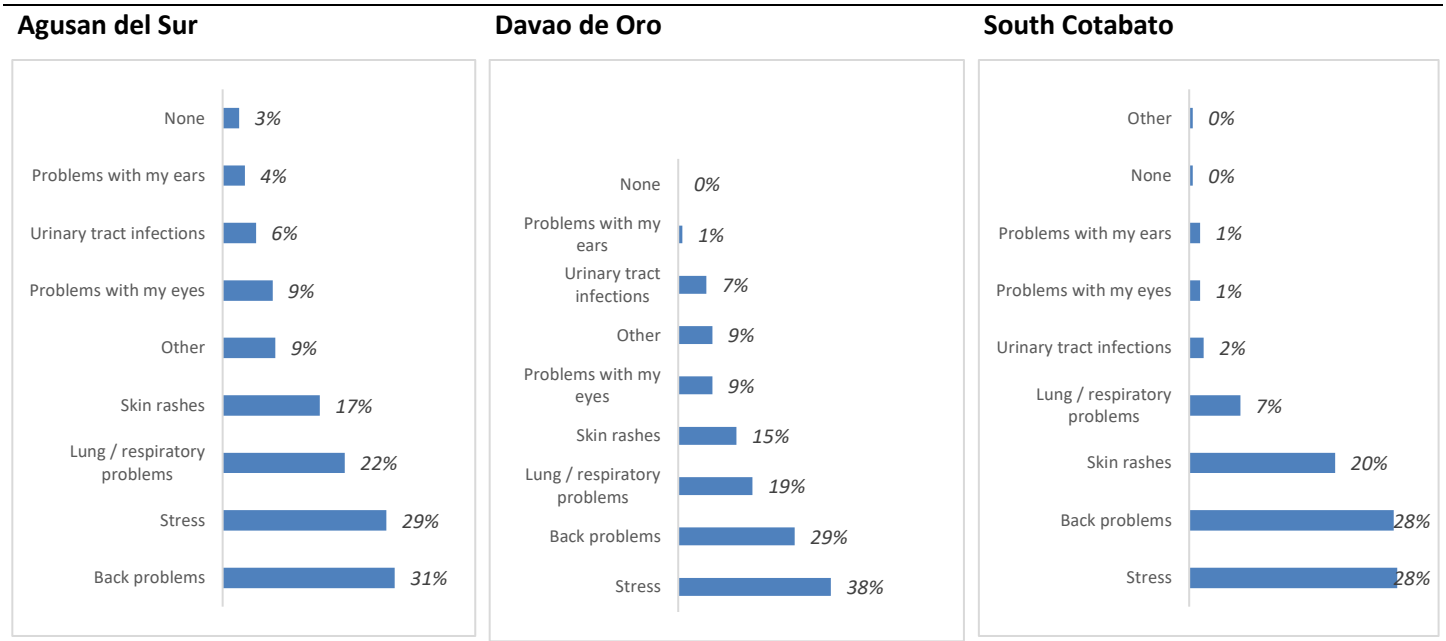
When asking what could or should be done about the concern on the family and community health, the most frequently given advice was to clean up the surroundings (44% gave an answer that could be coded as such), that is, removing dust and polluting substances from the working area. Also, 16% said that everyone has to follow the rules and regulations of the mine, meaning wearing proper safety gear and being careful when performing the work. However, 7% said that they have 'no choice, no other option' but to confront the health risks as they are. Some responses addressed responsibility, for example, 'it is the government's responsibility' (4%), 'always be a responsible miner' (4%), have 'awareness of the environment' (3%) and 'avoid using chemicals or have awareness of the effects of using mercury' (3%). Finally, 6% of responses did not fit into any coding category because of their singularity. These were coded as 'other'.

Figure 26. What could be done to improve community health?



Next, we asked respondents about the health problems they are facing themselves. This was a multiple choice question where respondents could choose different options at the same time. From the different options that were given, stress and back problems are experienced by nearly all workers from our three cases (see Figure 27). Stress is mentioned by 97% of respondents (31% in Agusan del Sur, 38% in Davao de Oro and 28% in South Cotabato). Back problems are common in 86% of workers (29% in Agusan del Sur, 29% in Davao de Oro and 28% in South Cotabato). Half of respondents reported suffering from skin rashes and lung or respiratory problems. Skin rashes are experienced by 52% (17% in Agusan del Sur, 15% in Davao de Oro and 20% in South Cotabato) and lung/respiratory problems by 47% of workers (22% in Agusan del Sur, 19% in Davao de Oro and 7% in South Cotabato). Important to note here is that, although a high percentage of respondents reported health issues, answers to previous questions seem to indicate that they do not relate them to mining activities or do not see them as a matter of concern. As mentioned, this might be because they are so (economically) dependent on mining, meaning that they accept the risks as 'part of the job'. They may realize that it makes little sense to worry, as they have no alternative anyway.

Figure 27. Health problems



We asked respondents to list the most common problems in the mining area, presenting them with a number of choices: alcoholism, child labour, criminality/theft, drugs, extortion, gender-based violence, prostitution and other.

Table 20. Most common problems in the mining area

Common problems	Agusan del Sur	Davao de Oro	South Cotabato
Alcoholism	69%	45%	62%
Child labour	27%	17%	10%
Criminality/theft	6%	10%	1%
Gambling	0%	7%	0%
There are no problems in the mining area	0%	2%	0%
Other	1%	2%	1%

Alcoholism is considered one of the major problems in all three case studies (by 69% of respondents in Agusan del Sur, 45% in Davao de Oro and 62% in South Cotabato). Alcoholism in gold mining is strongly present in the Philippines. Alcohol and karaoke are popular forms of entertainment among workers. Rum and beer are the alcoholic beverages of choice. They are usually consumed when miners have their payday. All along the three mining sites, there are restaurants with karaoke equipment where miners can amuse themselves and drink. In other cases, alcohol is sold in *sari sari* stores (small neighbourhood shops) in the surroundings of the mining area. In mining areas where alcoholism is present, prostitution is likely to exist as well. However, in our three case studies, no prostitution was visibly present, and locals denied the presence of prostitutes.

Child labour is the second most common problem in the three provinces (27% in Agusan del Sur, 17% in Davao de Oro and 10% in South Cotabato). In our survey, six respondents are workers under 18 (four in Agusan del Sur and two in South Cotabato). However, many others looked younger than 18, thus it is likely that some hid their real age. Child labour is a major issue in the Philippines. In the

latest Survey on Children (Philippine Nationals Statistics Office & ILO, 2011), the regions of our case studies reported high percentages of child labour, with 15% in the region of Caraga (Agusan del Sur), 14% in Davao de Oro and 14% in the region of south-central Mindanao (South Cotabato). In Agusan del Sur, a female stone washer was being interviewed when two of her children, boys under 15 years old, joined her in the activity. She later mentioned that she had seven children and that the boys would come with her to stonewash after school, especially the youngest ones, because she could not leave them at home alone. This is just an example of the kind of situations encountered during the research that indicate the presence of child labour. Yet this example also shows that for many families in mining areas, the help of their children and the latter's involvement in the activity become necessary.

The third most common problem according to respondents is criminality or theft (6% in Agusan del Sur, 10% in Davao de Oro and 1% in South Cotabato). In this context, criminality and theft are related to gold and the fight for power. They can also involve the presence of armed groups in nearby areas, as it is known that these take a share of the mining proceeds. Our case in Davao de Oro has experienced numerous deadly disputes over access to power and gold, which may explain why it has the highest percentage on criminality and theft among the three cases.

Finally, 7% of respondents chose gambling as the most common problem in Davao de Oro. Gambling in the context of the Philippines is usually related to rooster fights, which are very common in the mining area of Davao de Oro and are a form of entertainment. Interestingly, some respondents considered these to be a problem, although ASGM activities themselves are often considered a form of gambling as well.

Table 21. Solutions to problems in the mining area

Solutions	Agusan del Sur	Davao de Oro	South Cotabato
Traditional medicine	88%	83%	80%
Family/wife	61%	56%	59%
Prayer	47%	45%	45%
*Other**	4%	0%	0%

***(take advice, support of friends, none, take rest)**

When people were asked about potential solutions to these problems, most referred to traditional medicine (88% in Agusan del Sur, 83% in Davao de Oro and 80% in South Cotabato). This may be explained by the lack of access to healthcare. During field research in Agusan del Sur, two cases of mercury poisoning were found in two children. Relatives of these children, including their mothers, mentioned that they did not receive any information about the condition of their children because there are no doctors in the area. Medical services are completely absent. If people fall ill, traditional medicine is used. Consulting a traditional doctor in the community is common in Agusan del Sur, and this is also done for illnesses such as alcoholism.

Figure 28. A married couple with two children. The woman works in the ball mills, while the husband is an *atrasero* in the informal mines of Agusan del Sur

Source: photo by Eugenia Robles, 2019

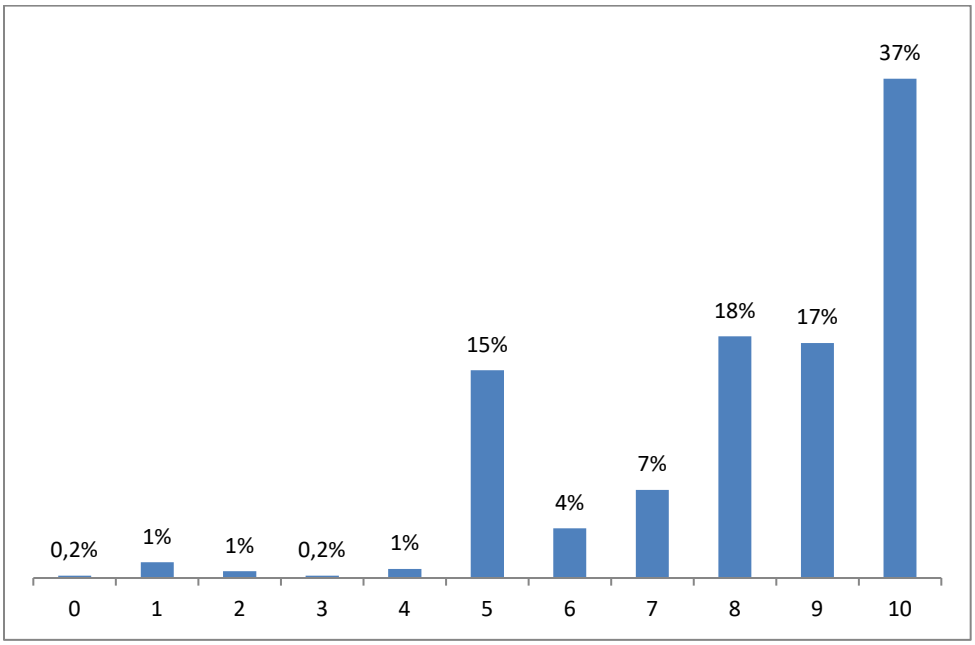
The second most-chosen solution is family/wife (61% in Agusan del Sur, 56% in Davao de Oro and 59% in South Cotabato). This means that tightening bonds and remaining close to the family or in this case partner (wife) are seen as solutions to most problems in the community. In this context, families are the building blocks of the community: they represent the motivation of workers to continue mining and are their main source of support. It is thought that with the help of loved ones, one could potentially overcome most (if not all) challenges.

Prayers are the third most-chosen solution, with 47% of respondents in Agusan del Sur, 45% in Davao de Oro and 45% in South Cotabato picking this answer. As stated, religion is strongly present in the Philippines, and prayers not only are part of people's convictions but also represent a way in which they can express their hopes and anxieties. With scarce economic resources and institutional support to rely on, praying is these people's response to uncertainty. It is locally said that faith can move mountains, and Filipinos use faith not only as a solution but also as a survival mechanism in the everyday.

At the end of the survey, we asked a closing question about overall job satisfaction. With 0 being not happy at all and 10 being very happy, 37% respondents said that they were happy (12% in Agusan del Sur, 15% in Davao de Oro and 10.1% in South Cotabato). Other 15% selected a score of 5, mild satisfaction (6% in Agusan del Sur, 4% in Davao de Oro and 6% in South Cotabato). Only one respondent (0.2%) in Agusan del Sur said to not be happy at all. The results indicate satisfaction more than its opposite. They show that most workers are happy with their job. This attitude was also visible when the interviews and survey were conducted. Although workers would express some of the challenges that the work implies, they appreciate their work and the income that mining provides to their

families. Instead of complaining about the mining activity itself, their complaints were mostly focused on restrictions on mining imposed by the government.

Figure 29. Overall level of job satisfaction (from 0-low to 10-high)



4.7. Production, revenue, sales

ASGM production is known to be highly variable, which is confirmed by the survey data: 91% of respondents said there is strong variation between high and low production periods. This variation can be explained by seasonality (43%), the availability of labour (23%) and finance (16%) or technology (9%), as the following table shows. For the option 'other' (8%), almost all respondents mentioned that the variation in production depended on the availability of the gold vein.

Table 22. Production variation

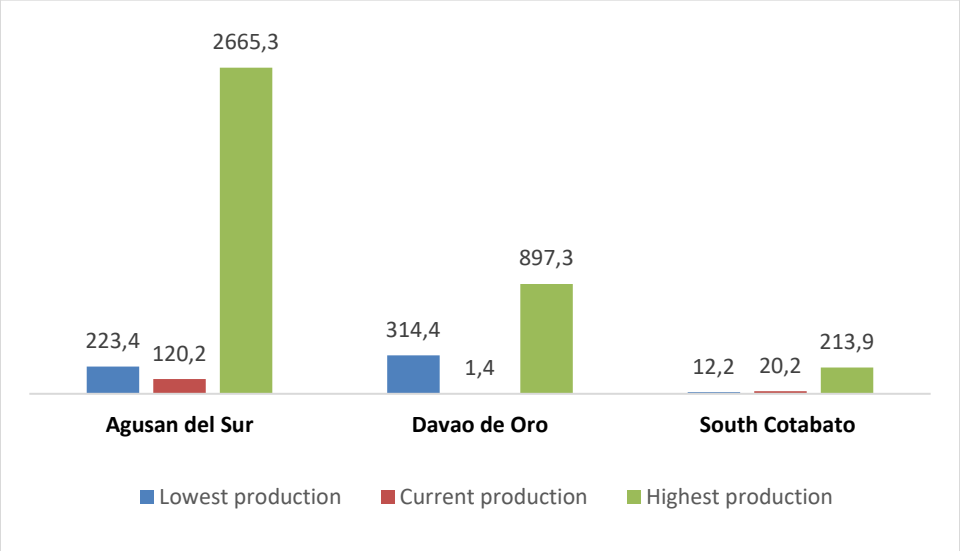
Value	Frequency	%
Seasonality	413	43%
Availability of labour	223	23%
Availability of finance	156	16%
Technology	81	9%
Other (specify)	75	8%
No response	4	1%

Just as production variation is difficult to estimate, so are miners' earnings. Access to this information becomes challenging because of the informal nature of the mining activity and workers' reluctance to disclose details on this. This may be because of fear or simply because they do not know the production volumes of the entire mine. However, workers were asked to think about when the mine had the highest production and to estimate how much gold was produced during that time. The same question was asked about the lowest and current production period. Figure 30 displays the respective estimates. It is important to mention that almost half of

respondents did not want to or could not answer to this question. Consequently, the production figures in grams that were given were varied and far apart. It is likely that many of these numbers were not accurate or invented at the moment of the question due to the reservation that respondents had on revealing the real figures. As a consequence, production estimates fluctuated tremendously among respondents. Averages were calculated on the basis of all answers. Answers were grouped into lowest production period, current production period and highest production period. The results portray the estimates of production in grams, per week and per *corpo* (team) (see figure 30).

Looking at the three periods, we can highlight the following observations. First, the grams produced during the current production period seem to be less than those of the lowest production period in Agusan del Sur and Davao de Oro. When the question was asked, 'current production' had not yet concluded, so it is likely that respondents did not give the full volume of production. On the other hand, it is likely that the figures were indeed lower than the lowest production period respondents remember. In the case of Davao de Oro, there was indeed a crisis in gold processing at the time the survey was implemented. This affected production, and workers would say that in better times they would produce double or triple the current amount. The fear of another intervention threatening to close the ball mills prevented workers from expanding operations. At the time of the survey, tunnels were not working at 'full' capacity. Second, Agusan del Sur shows considerably higher production than the other two mining areas. The highest numbers were given by workers from FMC positioned at the high end of the hierarchal pyramid (portal guard, maintenance and monitoring). These workers are closely informed about the overall production of the mine and share it openly. This was not the case in the other two mining areas, where information on production is received by low-end workers in the labour hierarchy, who make calculations based on their own production (tunnel) and not on that of the entire mine. The rate of non-responses for this question is not shown in the figure, yet the percentages were 35% in Agusan del Sur, 39% in Davao de Oro and 31% in South Cotabato.

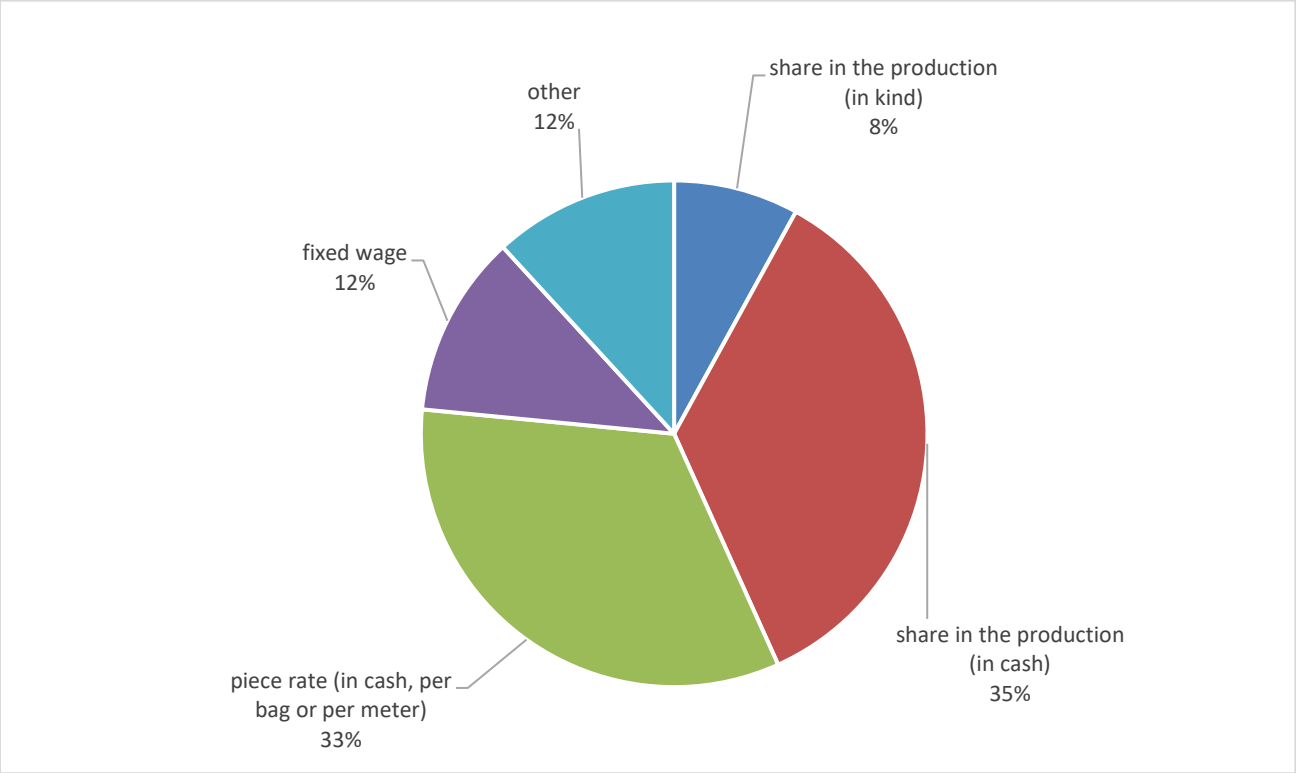
Figure 30. Production level in grams, per week and per *corpo* in each province



Regarding the type of payment (see Figure 31), 35% of respondents said they are paid in cash according to their share in the production. This payment is made after processing all ore sacks, and the share in the production is verbally agreed upon upfront. Another 33% of respondents are paid in cash on a piece-rate basis, which depends on how much gold was retrieved per ore sack or worked metre. A

fixed monthly wage was mentioned by 12% of respondents, all from the mine of FMC. Another 8% reported to be paid in kind, not in cash. This means that they receive a sack or sacks of ores, which they will process themselves. Finally, 12% chose the option 'other'.

Figure 31. Type of payment



First, we present the payment system in the formal mining operations we surveyed. According to FMC's president, all workers are paid in the form of a salary and receive a share in the production. The latter is reportedly based on a 30/70 scheme, where 30% is distributed among workers and staff and 70% goes to the financier and/or tunnel owner. However, when interviewing workers, the story seemed different.

We found that managerial and security positions are paid on a monthly basis, or every 15 days. For specialized positions, the payment is completed once workers have completed their task. For example, a timber worker will make an estimation of the time needed for a tunnel repair and negotiate a daily fee for the work performed. Once the repair is done, this worker will receive the full payment. For longer periods of work (more than two months), payments can be done in parts or a payment modality is negotiated with FMC. Each position may have different fees, depending on the difficulty of the work to be done and the specific skills of the worker. Having worked with many of these technicians on a long-term basis, FMC has a portfolio of specialized workers they can consult when needed.

For workers at the bottom of the hierarchy, such as *atraseros* and *abanteros*, payment is different. For instance, *atraseros* (between five to 10 per team) get paid as a team, based on the number of ore sacks they gather. A minimum of 500 ore sacks per day is required, taken from all operating tunnels. Each sack of ore is rated at 18 PHP (0.32 EUR), which results in an average of 9000 PHP per day for a total of 500 sacks. Miners work two to three days a week, and the total amount of money is paid at the end of each week and divided among all team members. *Atraseros* do not have a fixed position but are hired seasonally (what locals know as 'hired on call'), depending on the company's operating activities.

On the other hand, *abanteros* are paid a fixed amount of 305 PHP (5.34 EUR) per day, working an average of 12 hours per day and two days a week (or as needed). They are hired seasonally, like *atraseros*. Within this system, it is also possible to receive a cash advance for emergencies, which is like a loan that needs to be reimbursed. According to FMC's administrator, this advance is given

> *[…] Especially for the basic needs because their salary [*abanteros' *and* atraseros'*] is not enough, or because it is not the time to pay. Especially if there are emergency cases like health problems of their children an* atrasero *will ask to borrow a small amount of money (interview with FMC's administrator, June 2019).*

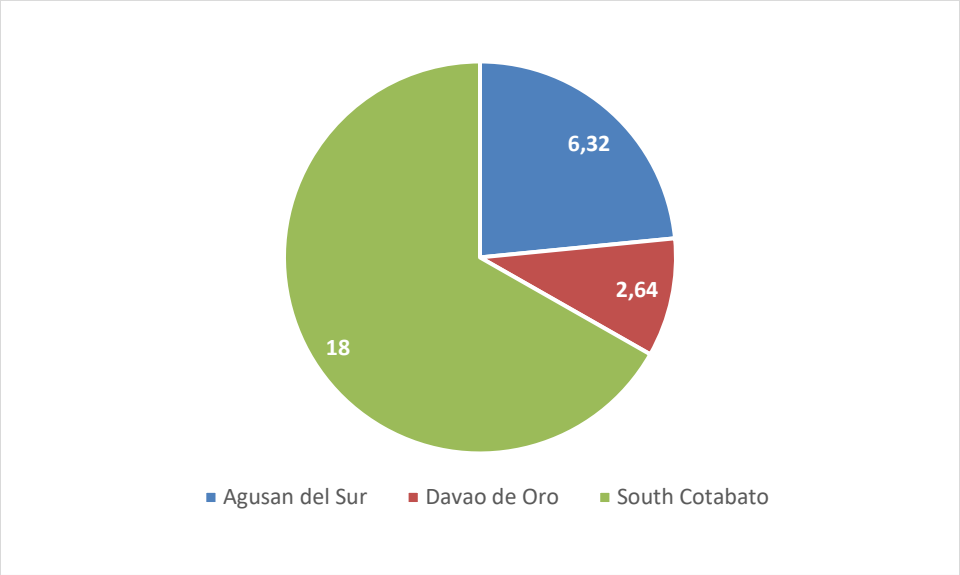
When we asked *abanteros* and *atraseros* working for FMC what kind of system they would prefer, 70% chose the option of 'share in the production', as we will explain below.

Second, let's turn to informal mining, where the most common type of contract is a verbal agreement (as indicated by 60% of our respondents, while 29% did not respond). The only written documents we encountered, which may explain the 8% of respondents claiming they have a written contract, were promissory notes or registration books. Promissory notes are common when it comes to payments in the Philippines. They are considered receipts or written agreements that seal the agreement between giver and receiver. Registration books are notebooks used to register share revenue payments, team members' attendance, etc.

The two dominant payment systems, as Figure 31 shows, are a share in the production paid in cash after processing and a piece-rate system. This used to be different. Previously, the most common payment was a share of ore sacks before processing. Usually this was done on a 70/30 or 60/40 basis, where the highest percentage went to the financier or tunnel owner and the rest was divided among workers. In this system, workers are responsible for processing their own sacks. They also feel more in control of the process, although paradoxically the outcome is more uncertain, as it is difficult to estimate how much gold can be extracted from a particular ore sack.

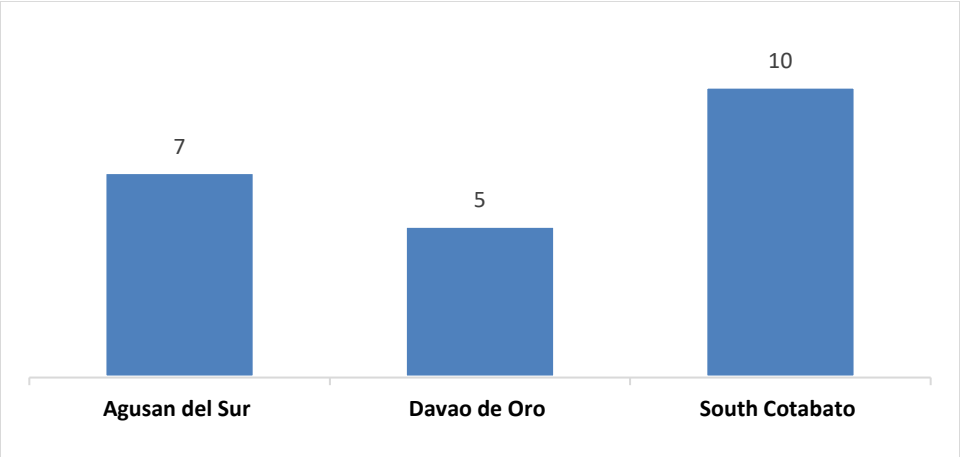
For various reasons we have mentioned, it is extremely difficult to assess miners' earnings, so these results should be interpreted with caution. When asking our respondents about the payment system, we also asked them to specify how large their share was. Because of the variety of responses to this question, an average will be presented for each category. We first present the results for the most common payment system: a share in the production in cash, per person, per week after processing (see Figure 32). This type of payment is done on an individual basis: after the processing phase, total revenues are divided among members of the *corpo*. The average payment is 319 PHP (6.32 USD) in Agusan del Sur, 133 PHP (2.64 USD) in Davao de Oro and 846 (18 USD) PHP in South Cotabato.

Figure 32. Share in the production in cash, per person, per week (in USD)



Next, we present the results for the piece-rate payment system, where workers receive an amount of cash based on the number of bags or the number of metres worked. These figures show amounts in PHP, per week and per *corpo*. In this case, payment is usually done in ore sacks for the entire *corpo*, which are divided into equal parts and distributed among its members. However, since this payment is made in kind and a value is assigned later, depending on the quality of the ore, the quantity of ore that each member receives will vary. Hence, it was easier for respondents to give the amount per *corpo* rather than per person. In this case, the average piece rate in is 360 PHP (7 USD) in Agusan del Sur, 266 PHP (5 USD) in Davao de Oro and 510 PHP (10 USD) in South Cotabato (see Figure 33).

Figure 33. Piece rate per week, per *corpo* (in USD)



All these results show the difficulty of estimating earnings but also the complexity of the payment and sharing systems in ASGM. Different types of workers are paid differently. We also asked our respondents to indicate how other categories of workers are generally paid. This was a multiple-choice question, where each respondent could describe a payment system for each position. Hence, percentages for these responses exceed 100. For the case of the *abanteros*, 85% of respondents said these are paid via a share in the production in cash, 68% said these are paid with a fixed wage, 60% indicated that payment is a share in the production in kind (ore

sacks) and finally, 59% referred to a piece rate as payment. For the case of *atraseros*, 52% said that these are paid via a share in the production in cash while 43% said that these are paid by piece rate. Finally, 2% said these workers are paid with a share in the production in kind and 1% referred to a fixed wage. With regard to the team leaders, 56% of respondents said these are paid through a share in the production in cash, 34% said by piece rate and 7% by fixed wage. Those said to be paid mostly with a share in the production (in cash) are the cook, the driver and the portal guard.

Interestingly, the preferred payment system seems to be a share in the production (in cash) and piece rate. The first is preferred by 36% of respondents. When asked why, 14% said 'I get cash and it is easier to buy anything'. Of the 33% who prefers to be paid by piece rate (in cash, per bag or per metre), 9% said this is because 'the more you work, the more you get. The higher the share'. Finally, 14% of respondents said they prefer a fixed wage, and of those, 6% said this is 'because I have a stable and clear salary each month'. In the below tables, we recoded the answers to the open-ended questions.

Table 23. Reasons for preferring a share in the production

Responses*	%
Because I get cash and it is easier to buy anything I need	14%
Because it is fair to all of us	10%
Because it is direct cash and I can send money on my family	6%
Because there is no hassle	3%
Because there is no choice. This is the existing system	1%
It is the best sharing scheme based on my experience	0%
Other	1%
No response	0%

***Note: Responses to the open question were coded for its interpretation**

Table 24. Reasons for preferring a piece rate

Responses*	%
Because the more you work, the more you get/the higher the share	9%
It is the best sharing scheme based on my experience	6%
Because it is the manager's/tunnel owner's decision	3%
Because there is no choice. This is the existing system	3%
It is okay for me; I am happy with this system	3%
Because it is direct cash and I can send money to my family	2%
Because it is more advantageous for us	2%
Because I get cash and it is easier to buy anything I need	1%
Because it is the company's policy	1%
It depends on how many sacks of stones we crash	1%
Because it is fair to all of us	0%
Because you are the one processing the gold	0%

Responses*	%
Other	0%

***Note: Responses to the open question were coded for its interpretation**

Table 25. Reasons for preferring a fixed wage

Responses*	%
Because I have a stable and clear salary each month	6%
Because it is the company's policy	2%
Because my salary won't get lower	2%
Because I work in management and I get a fixed salary	2%
Because you can get an advance in cash	1%
Because it is more advantageous for us	0.3%
Because I have a good salary	0.3%
Because I get cash and it is easier to buy anything I need	0.2%
Because there is no choice. This is the existing system	0.2%
It is the best sharing scheme based on my experience	0.2%
Other	2%
No response	0.2%

***Note: Responses to the open question were coded for its interpretation**

Regarding additional (non-monetary) benefits, 68% of respondents said that they do not receive any (21% in Agusan del Sur, 28% in Davao de Oro and 18% in South Cotabato) and 2% did not respond. The following tables present the additional benefits per province as indicated by those respondents who receive them (31%). Agusan del Sur has the biggest variety of additional benefits (12% of workers receive them) than Davao de Oro (4%) and South Cotabato (15%). This is due to FMC, which as part of its best practices has provided different benefits to its workers. It was observed that 9% of answers in Agusan del Sur came from workers at the low end of FMC's labour hierarchy.

Figure 34. Worker at the high end of the labour hierarchy of FMC looking at a gold vein. Tunnels at FMC are much wider than those found in informal mining areas

Source: photo by Eugenia Robles, 2019

Table 26 presents a breakdown of the additional benefits that 12% of workers receive in Agusan del Sur, including 5% 'other', which covers the following benefits: money incentives (6%), a privilege-share[6] (14%) and, a cash bonus of 1000–2000 PHP every December (19%). Additionally, 3% receive credit loans and salary advances, which are deducted from workers' payments. Nevertheless, they still constitute an advantage, considering that many of these workers need to send money to their families every two weeks. Salary advances are also given in case of emergencies, for example health problems of the worker him- or herself or his or her relatives. Food advances are given mostly in informal mining, so that workers can subsist at the beginning of the tunnel operation, when many do not have an income to maintain themselves. The financier of the tunnel will provide food, the expenses of which are deducted from workers' incomes at the end of the month.

Shelter is also provided to workers who do not live in the mining area. Usually, a room is given to a group of workers. Since in the Philippines it is common to sleep on the floor – on handwoven sleeping mats called *banig* – most workers bring their own mats and reside in these rooms near the mining area for as long as the operation runs.

[6] A privilege share, is an amount of gold that is divided amongst workers when there is production surplus, or when the expected production quota has been exceeded.

Tables 27 and 28 present the additional benefits of Davao de Oro and South Cotabato. As can be observed, both provinces have considerably fewer types of benefits than Agusan del Sur. This can be analysed in light of formal and informal mining. Although some benefits are similar, it is obvious that a larger number of workers in Agusan del Sur than in the other two cases receive the majority of these (via the FMC in Agusan del Sur). Davao de Oro offers food to 3.7% of its workers and salary advances to only 0.5%. However, South Cotabato has more advantages than Davao de Oro, with salary (9%) and food (5%) advances. Another reason why South Cotabato has more benefits than Davao de Oro is how the former is organized. As it was formed on the basis of different associations, South Cotabato is more closely attuned to its workers' needs than Davao de Oro.

Table 26. Additional benefits Agusan del Sur

Additional benefits	%
Other	5%
Credit/loans + salary advances	2%
Salary advance	2%
Food	1%
Food + shelter + salary advances	1%
Food + shelter	1%
Food + shelter + credit/loans + salary advances	0.3%
Food + shelter + credit/loans	0.2%
Food + shelter + credit/loans + salary advances + equipment	0.2%
Shelter	0.2%
Food + shelter + credit/loans	0.2%
Credit/loans + salary advances + equipment	0.2%

Table 27. Additional benefits Davao de Oro

Additional benefits	%
Food	4%
Salary advances	1%

Table 28. Additional benefits South Cotabato

Additional benefits	South Cotabato
Salary advances	8%
Food	4%
Food + salary advances	1%
Credit/loans + salary advances	1%

Once the gold has been extracted from the ore, it is sold in a local gold shop. About half our respondents (51%) said they sell their gold themselves (13% in Agusan del Sur, 54% in Davao de Oro and 82% in South Cotabato) and 49% said they do not. Of those who sell it themselves, 25% sells it to a financier (0.2% in Agusan del Sur, 1% in Davao de Oro and 24% in South Cotabato), 21% to a small trader

(4% in Agusan del Sur, 13% in Davao de Oro and 3% in South Cotabato) and 4% at a gold shop in Davao de Oro (see Table 29). They generally reported not to have an agreement with the buyer, meaning that they do not have a prearranged price. When asked whether they are satisfied with the price, 51% did not respond. However, from a score of 1 to 5, with 1 being not satisfied at all and 5 being very much satisfied, 34% respondents said they were very much satisfied and 15% respondents chose 4, which is interpreted as very satisfied.

Table 29. Gold sales per province and type of buyer

Buyer	Agusan del Sur	Davao de Oro	South Cotabato	Total
Financier	0.2%	1%	24%	25%
Small trader	4%	13%	3%	21%
Gold shop	0%	4%	0%	4%
Mining company	0%	0%	0%	0%
Other	0%	0%	0%	0%
No response	0.2%	1%	0%	1%
Total	**5%**	**19%**	**28%**	**51%**

We also asked respondents what they would spend their hypothetical earnings on in case they had a lot of gold to sell. This was a multiple-choice question, where each choice could be assigned a value, with 1 being very likely and 5 being very unlikely. The first option was to spend their earnings on family needs. This is considered very likely in the three provinces, with a total of 98% responses choosing this option. This indicates a high commitment to family responsibilities. A second option was to spend the earnings on having fun with friends, drinks and prostitutes. Here, only one respondent (0.2%) said it is very likely, versus 33% respondents who said it is not likely at all (13% in Agusan del Sur, 10% in Davao de Oro and 10% in South Cotabato). This might reflect a desirability bias, as respondents know this is not a desirable answer, but it still displays a stark contrast with spending earnings on family needs. The result can be considered remarkable, given the general reputation of ASGM miners as being excessive consumers of alcohol and prostitutes. Sharing the money with co-workers is seen as unlikely by most respondents (43%) in the three provinces. Investment (in a house, car, motorbike etc.) is looked at positively by nearly half of respondents (43%), with similar percentages in each province (14% in Agusan del Sur, 14% in Davao de Oro and 15% in South Cotabato). However, this option also received some responses showing doubt by 40% of respondents (18% in Agusan del Sur, 11% in Davao de Oro and 11% in South Cotabato), who think such investment is neither likely nor unlikely. Saving these earnings is likely for 36% of respondents, mostly in Agusan del Sur (16%), followed by South Cotabato (11%) and Davao de Oro (9%), versus 22% who thought it is very unlikely (10% in Davao de Oro, 8% in South Cotabato and 5% in Agusan del Sur).

The following figures visualize the answers to the question ‘Imagine you have a lot of gold to sell, how likely are you to spend your money on the following?’

Figure 35. Spending hypothetical earnings on family needs

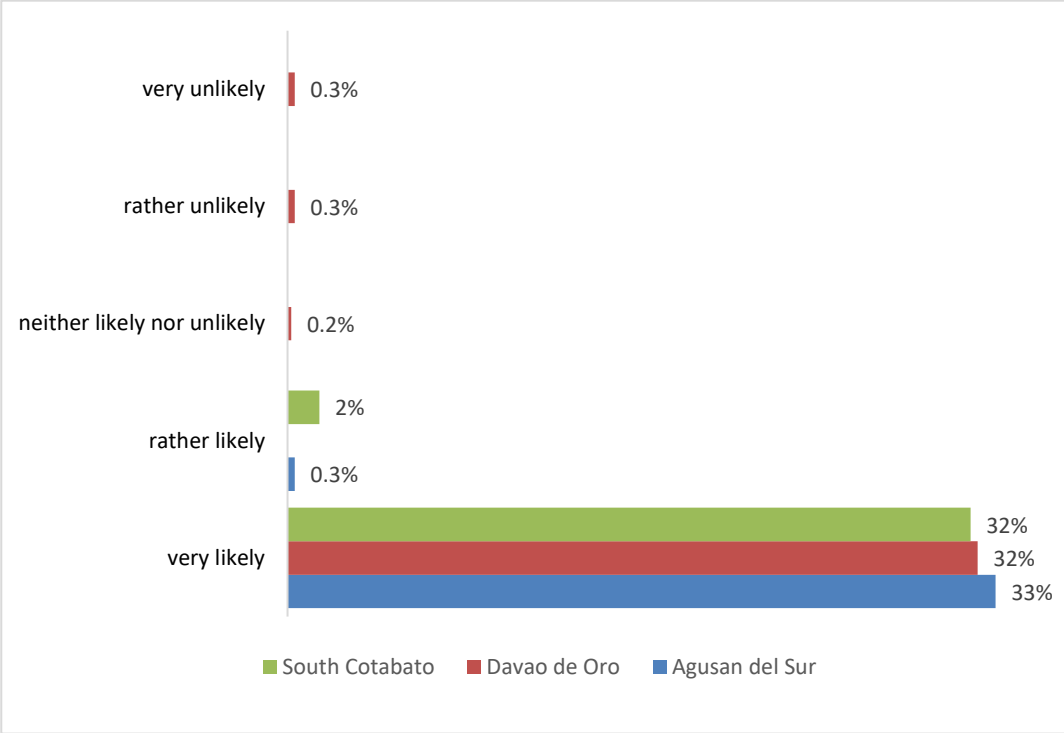


Figure 36. Spending hypothetical earnings on fun with friends (drinks, prostitutes)

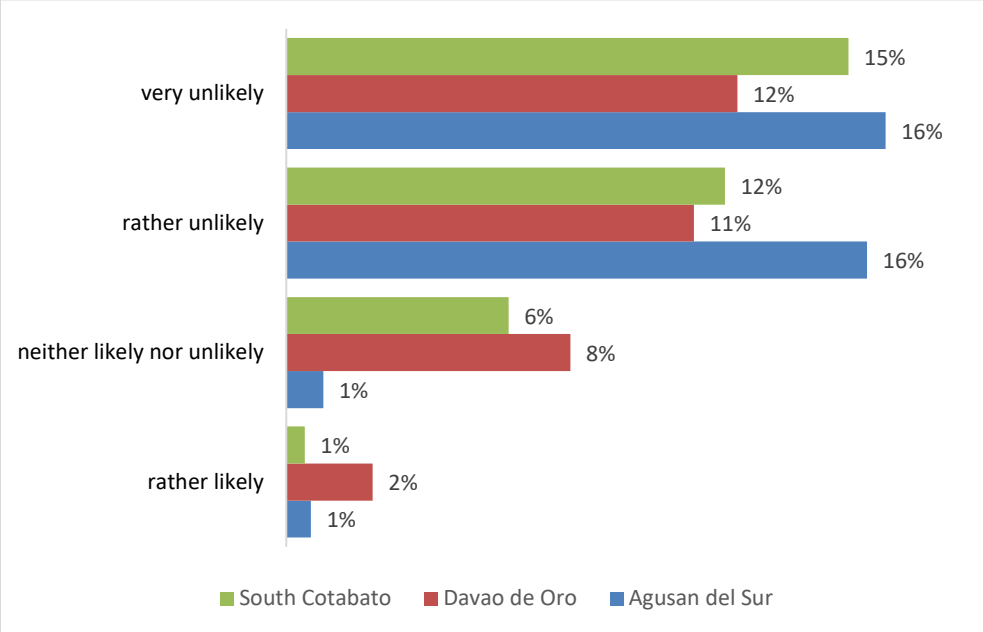


Figure 37. Sharing hypothetical earnings with co-workers

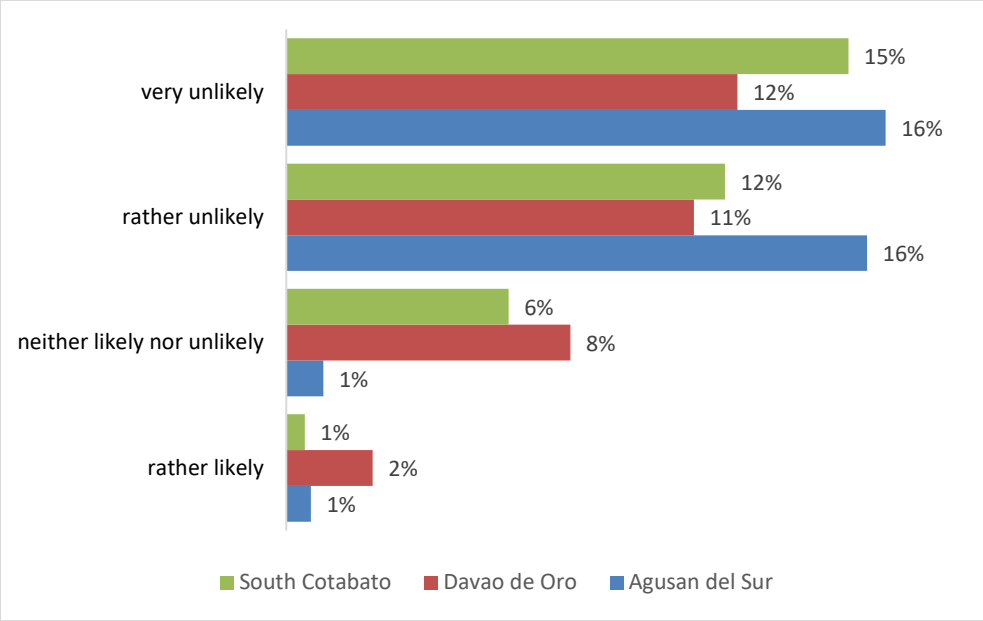


Figure 38. Spending hypothetical earnings – investing (in a house, car, motorbike, other)

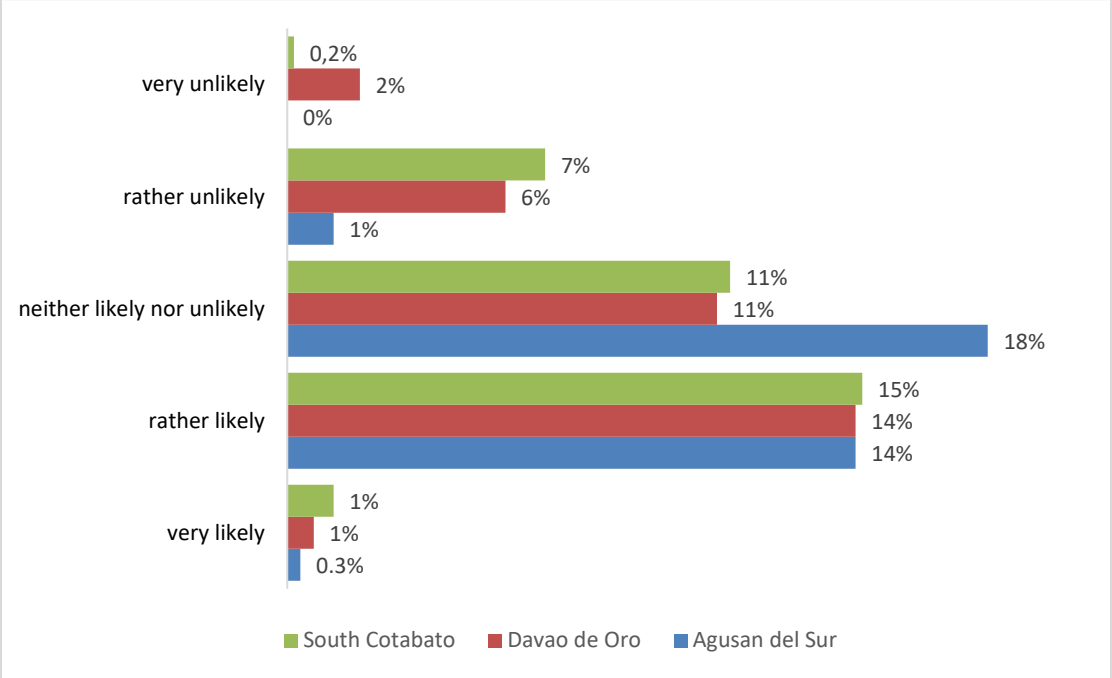
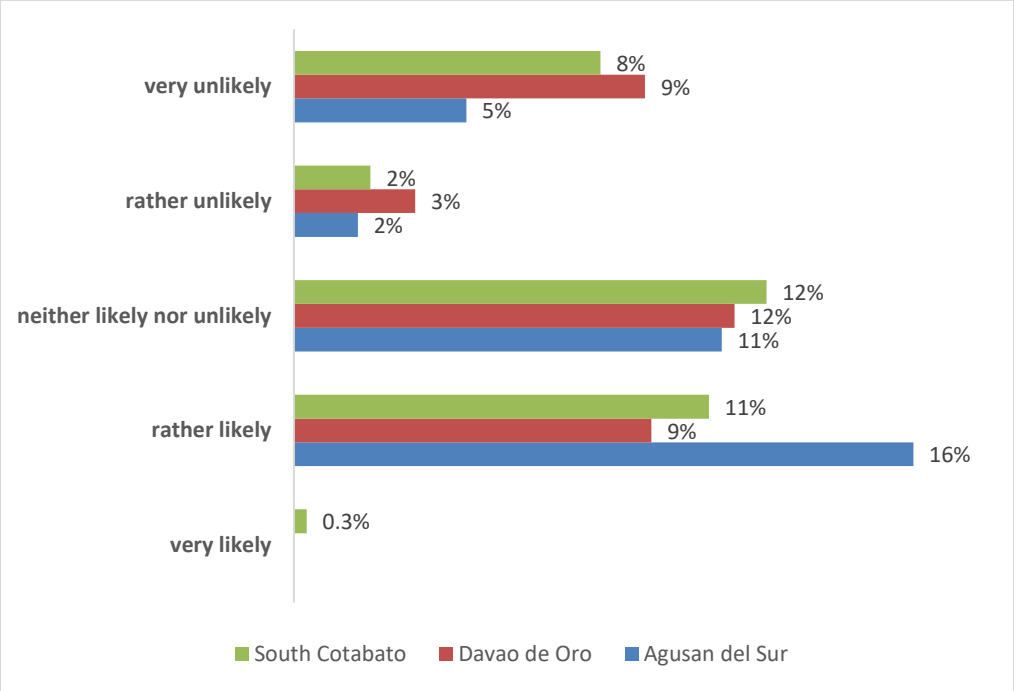


Figure 39. Spending hypothetical earnings on savings



4.8. Reasons to abandon ASGM

We asked miners what factors could make them want to abandon ASGM. We again presented them with different possible factors, for each of which they indicated whether it would be very likely (1) or very unlikely (5) to make them abandon gold mining. First, we asked them about safety risks. In total, 29% of respondents said that it is very unlikely that they would abandon gold mining because of risks to their safety in the mine. However, 21% of respondents said it is rather likely they would do so. Health risks were seen by 25% of respondents as very likely reasons to abandon the job, versus 17.3% of respondents who said it is very unlikely they would do so. Environmental risks were chosen as a very likely reason to abandon gold mining by 26% of respondents, and were a very unlikely reason for 21% of respondents.

Finding another job that pays 5 USD a day was chosen as a very likely reason by 55% of respondents, versus 55% who thought of it as very unlikely. For a job that pays 10 USD a day, 31% of respondents said it is very likely they would abandon gold mining, versus 18% who said that it is very unlikely. Finally, for a job that pays 20 USD a day, 84% of respondents said it is very likely that they would abandon gold mining, versus 77% who said it is very unlikely.

Figure 40. How likely would workers abandon mining because of safety risks?

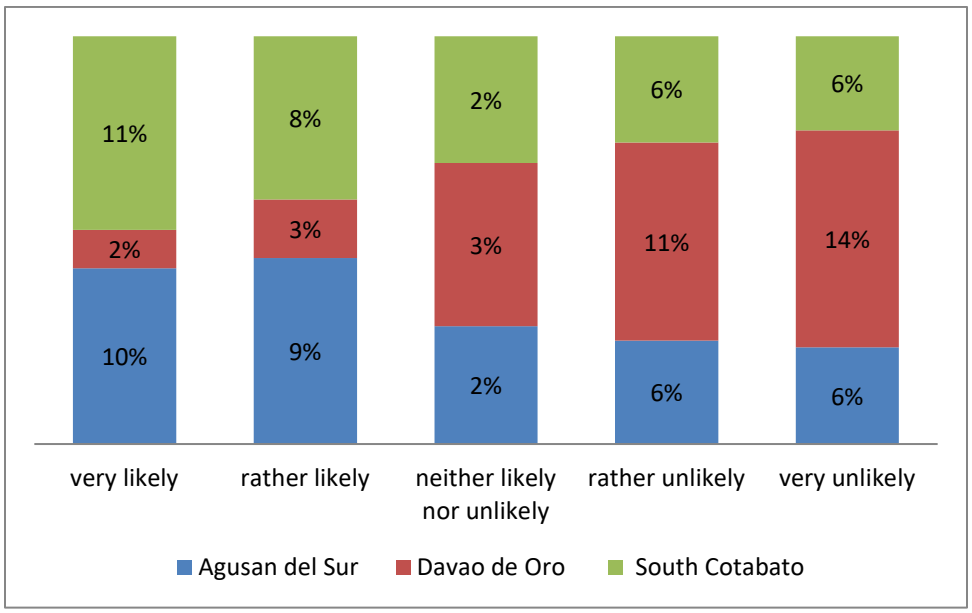


Figure 41. How likely would workers abandon mining because of health risks?

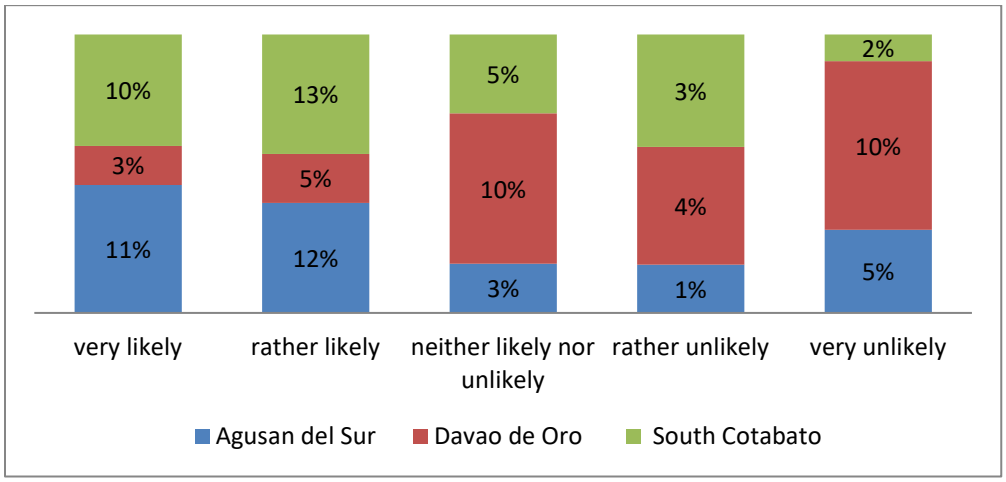


Figure 42. How likely would workers abandon mining because of environmental risks?

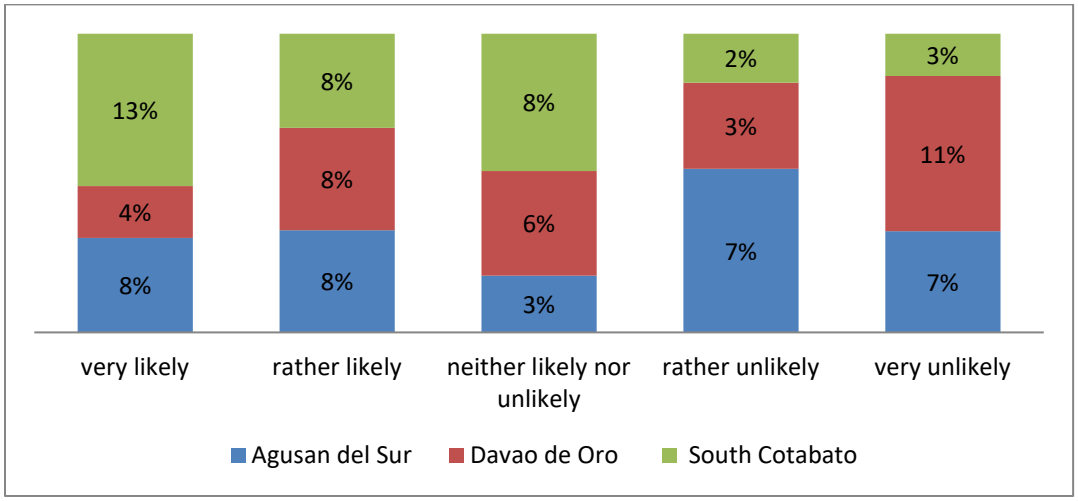


Figure 43. How likely would workers abandon mining for a job that pays 5 USD/day?

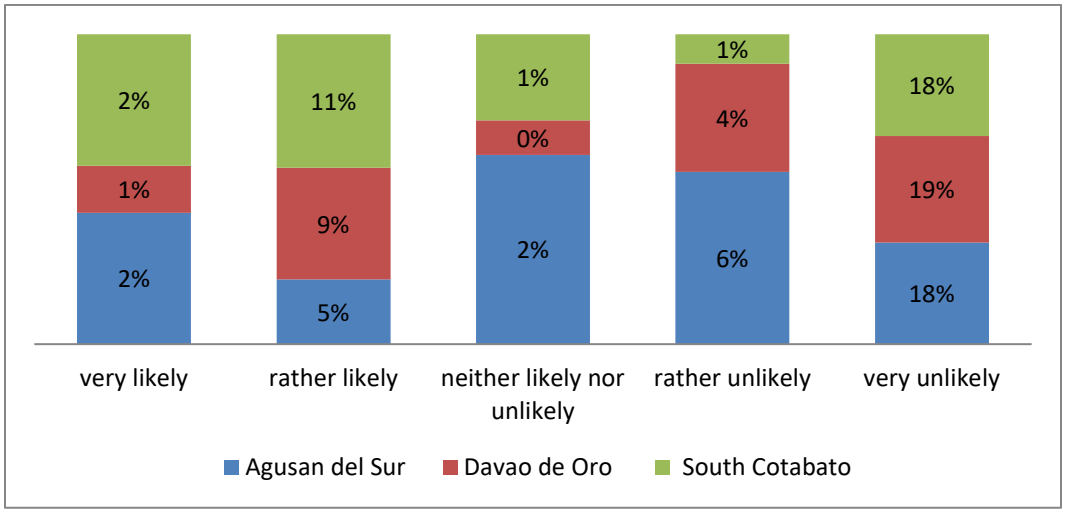


Figure 44. How likely would workers abandon mining for a job that pays 10 USD/day?

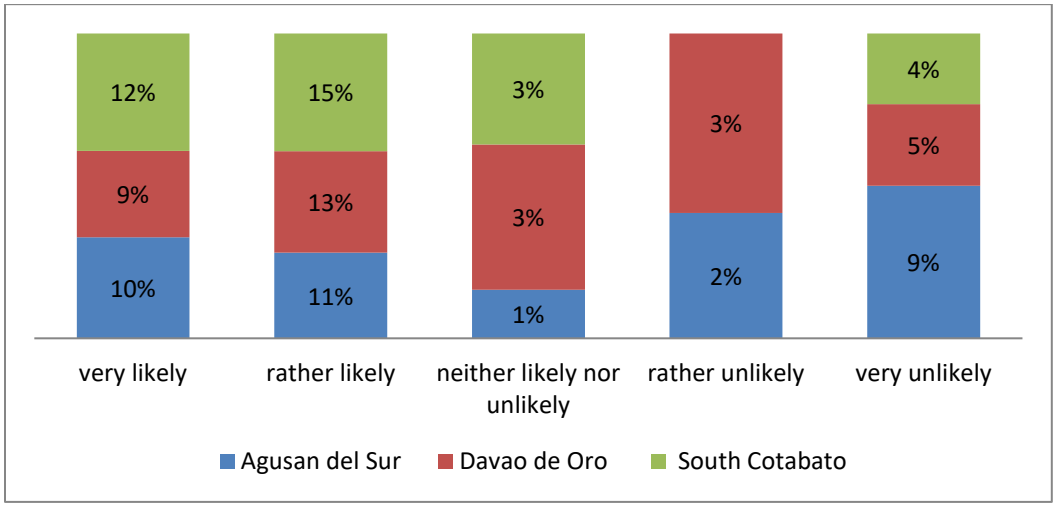
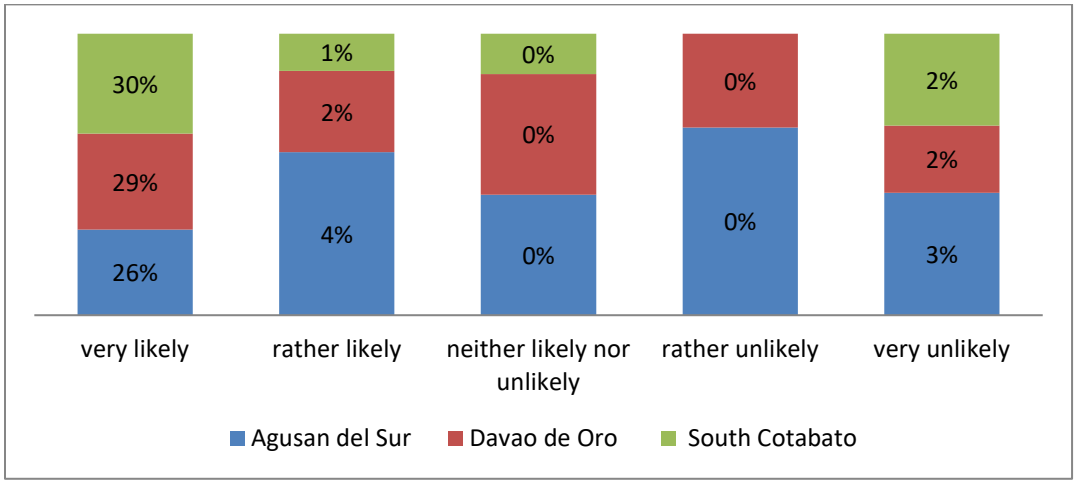


Figure 45. How likely would workers abandon mining for a job that pays 20 USD/day?



5. Recommendations

In this section we present two sets of recommendations. First we portray the list of recommendations given by workers through our survey in Table 30. Second, we present a list of recommendations analysed by the authors, after a series of validation workshops organized in the different communities in May 2022. Beverly Besmanos, Sub-national Coordinator of Bantay Kita coordinated the validation workshops, during which the survey findings were discussed with focus group participants in Agusan del Sur, Diwalwal and South Cotabato. The participants then discussed in small groups about specific topics such as health and safety, access to finance, or formalization, and came up with a series of recommendations.

The list of recommendations that survey respondents have put forward is very diverse, as Table 30 shows. Yet there are a number of recurrent requests. First of all, several respondents suggest providing alternative livelihood opportunities, in particular to women. Second, we see several recommendations related to non-monetary benefits, such as providing health and life insurance. Other respondents are asking to increase the price per metre or increase the workers' share in the production. Still others address requests to the government, such as an appeal to support them in legal procedures. A very specific request is for the government not to suspend ASGM operations and let the ball mills operate, as these are 'our main source of income in the community', as one respondent indicated. Table 30 presents the frequencies and not percentages of the responses. These responses were coded for a better understanding.

Table 30. Recommendations

Coded answers	Agusan del Sur	Davao de Oro	South Cotabato
Education for after school, for young people	3		
Increase the price per metre		1	
Increase the price per sack during hauling		1	
Increase the rate per day	1		
Provide access of potable water	10	5	5
Provision of benefits to the workers like social security service, life insurance and health insurance		1	
Review the membership of workers in the social welfare and development department of the local government, because there are a lot of villagers who are not members yet			2
The tunnel owner should increase the financing every week from 1,000 to 1,500 PHP			1
The tunnel owner should provide benefits to the workers, not only to management staff		1	2
The tunnel owner should provide scales to weigh the gravel for all of us, not to estimate the weight himself			1
Tunnel owners should provide life insurance to workers	10	15	8
The government should provide an alternative and sustainable source of income besides mining, which is adapted to the local economic reality	1		

Coded answers	Agusan del Sur	Davao de Oro	South Cotabato
Management needs to understand every situation that miners encounter; management needs to be patient and open-minded in dealing miners' queries and not treat them like slaves	2	2	4
Provide capital and an alternative livelihood to women	1		
Continue implementing good policies and procedures	1		
Maintain safety and always follow the rules and regulations of the company	1	3	
Have support from the government to legalize mining	1		
Have a monetary incentive like other workers	1		
Government support to stop deforestation	2		
Management should provide more training about safety	1		
Salaries for all workers should be fair		5	3
Request to the government to not stop mining operations, because they are our main source of income			1
The tunnel owner should provide December benefits to the tunnel workers			1
Increase the sharing scheme to 70% for the labourers			1
Separate the work of abantero *and* atrasero*, so it does not feel so hard on the worker*		8	
To not to stop ball mill operations in the community because it is very expensive and difficult to take all the stones to one centralized area		1	
There should be no political boundaries. The government should support everyone from the mining area on equal terms		1	
Educate the people regarding the mining law		1	
To finish road construction	3		
No response	166	154	171

Following the validation workshop, we present the following consolidated recommendations.

Recommendation 1: Strengthen the capacity of key government actors

The institutional capacity of regulatory bodies in ASGM can be strengthened to improve labour conditions, following the enforcement of existing labour legislation and occupational safety and health (OSH) standards. These institutions can design innovative policies on formalization and amend the existing Small-Scale Mining law aligned with the local context.

Additionally, to promote transparency and accountability in ASGM, the convergence between government bodies and civil society should be institutionalized. This implies the creation of local multi-sectoral bodies that will act as independent advisory bodies to improve the regulation of ASGM at the local level. The creation of the local bodies must include relevant departments from the government (social welfare - to tackle women and children's issues in the mines, health, ICT, etc.) and sectors from the community (IP, women, youth, workers, etc.).

Furthermore, establishing *Minahang Bayan* areas can help to improve regulation and monitoring of ASGM operations. A *Minahang Bayan* that is established in good partnership with the ASGM stakeholders, with meaningful participation mechanisms for its workers, can ensure a sustainable ASGM sector.

Actors involved: Regional Mines & Geosciences Bureau (MGB), Provincial Mining Regulatory Board (PMRB), Local Government's Provincial Environment & Natural Resources Office (PENRO), and Municipal ENRO.

Recommendation 2: Promote socially-sensitive trainings

Training is important for workers to improve their current skills and acquire knowledge on different topics that are pivotal to improving mining labour conditions. However, 95% of workers manifested to have never received any type of formal training. Most of the knowledge workers acquire is self-taught (51.2%), taught by a friend (21%) or relative (14%). Workers that are highly-skilled obtain this knowledge with time and experience, which allows them to ascend in the hierarchal ladder, possibly obtaining more benefits than workers positioned at the low-end of the labour hierarchy.

It was observed that 80.2% of respondents never occupied other positions than the one they are currently performing. Ascending from an *abantero* or *atrasero* position may take a long time, or may not happen at all.

In coordination with the Department of Environment and Natural Resources (DENR), local governments could use their local funds and existing revenues from ASGM to implement training programs. Investing in building capacities for workers can help address prevailing difficulties observed on the ground. In this sense, training should focus on safety, health, gold processing issues and financial education. Moreover, these trainings should have a gender perspective, meaning, consider the labour and concerns of women miners (stone washers).

Actors involved: DENR, local governments, tribal and community leaders, NGOs, private sectors, Financiers, local women association and / or council and workers.

Recommendation 3: Protect workers' health and safety

Safety plans and safety signalization should be available in the workplaces of miners. There should also be an office to which workers can report risks. Safety staff in this office should provide information and raise awareness on health and safety issues.

In order to keep a record on the health condition of workers and the community, regional government agencies in coordination with the concerned local government departments should conduct a health and socio-economic survey in ASGM areas. A database of this kind can contribute to better understanding the current situation, improving regulations, and doing targeted interventions.

Finally, the government should foster the presence of more doctors and medical staff in rural health units (RHUs), and offer an annual medical check-up for the population – with special focus on women and children - of the mining community, to identify symptoms caused by the exposure to toxic substances and heavy work.

Actors involved: National and regional government agencies, Municipal and provincial LGUs, SSM associations, tunnel operator, mine workers

Recommendation 4: Ensure that investments in clean and efficient ASGM-technology are socially sensitive

The government should provide existing ASGM technologies that can help to decrease dependence on mercury. Moreover, transition plans to eliminate mercury in ASGM should include access to capital and loans for gold processors. In order to do this, best practices like PPP (public - private partnerships) for capital investments in processing plants could be considered.

A contingency plan for workers who depend on current gold processing practices (using mercury) should be elaborated. This can include training on the management of these new technologies, or training in alternative economic activities that are directly or indirectly linked to mining practices, providing similar (if not better) living standards for workers.

Actors involved: National government, Financiers, workers, local governments, IPs, NGOs and external actors.

Recommendation 5: Provide access to finance

In order to provide economic opportunities to improve working conditions and household economies, financial assistance is needed. In this sense, a database on the financial (economic status) of workers should be elaborated. A financial assistance model for mine workers should be elaborated. Loan risks and debt probabilities should be taken into account when creating these models and a mitigation plan should be considered.

Funds for loans can be provided to ASGM workers through government banks, private banks and micro-finance institutions active in the localities, such as ASA Philippines, CARD, Lifebank, etc.

Actors involved: LGUs, government agencies, SSM associations, private sectors, micro-finance institutions, financiers.

Recommendation 6: Implement protection mechanisms for children in mining areas

The problem of child labour in ASGM is rooted in poverty, lack of education, and poor regulation. The national and local inter-agency monitoring of child labour in ASGM areas can be strengthened and institutionalized at the village-level.

Accountability of ASGM associations or cooperatives to comply with child labour policies can be advocated. Information and education regarding the prohibition of child labour in ASGM areas must be sustained.

The government should ensure the inclusion of households living in extreme poverty in mining areas into the national anti-poverty program (4Ps). This means that in order for the mother and legal guardians to receive a monthly cash transfer from the government, they have to assure children's attendance to schools, regular monitor their health, and provide nutritious food.

Since in many cases child labour is performed due to the family's reliance on the children to generate income, protection mechanisms should involve the entire household.

Actors involved: Department of Social Welfare and Delevelopment (DSWD) and its provincial and municipal counterpart, Department of Labour and Employment (DOLE), local governments, NGOs, women and their children.

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