Piloting a digital stakeholder engagement platform for Tanzania's mining sector: *Incident tracking & mobile surveys*

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EDITORIAL

Piloting a digital stakeholder engagement platform for Tanzania's mining sector: Incident tracking & mobile surveys

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Front cover image: Miner descending in pit (Mara, 2018 – Photo: IPIS)

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1. INTRODUCTION

This report describes the methodology and findings of a digital stakeholder engagement platform for Tanzania's mining sector, piloted by IPIS in October 2018. The pilot forms part of a project on 'Mapping the socio-economic and human rights impact of mining in northwest Tanzania'. The design and operation of this platform built on extensive data collection and analysis in the first phase of this project on *the nature, scope and impact of artisanal and small-scale mining* and *local community perceptions on industrial mining*.

The platform, which was designed in cooperation with the social tech enterprise *Ulula*, enables a **two-way communication** with communities working in and living around mining areas in northwest Tanzania. On the one hand, a selected group of informants can anonymously report incidents occurring in the mining sector via their mobile phones. Incident reports are streamlined in the platform's case management module. On the other hand, the platform allows to send out mobile surveys on selected topics to respondents' phones. In this way, the platform allows to complement and update contextual data on the impact of the mining sector in a hands-on and prompt manner.

This platform was **piloted during a 10-month period**, from October 2018 to July 2019. It served to test and try the potential of this approach, learn lessons on the nature of incidents occurring in the sector, and gain further insights on the socio-economic and human rights impact of small and large-scale mining. Given the small sample size for both the reported incidents and mobile surveys, these insights can only highlight certain tendencies and do not allow to draw general conclusions.

This report respectively presents the methodology, findings and lessons learned of the incident detection and mobile survey components of this stakeholder engagement platform for Tanzania's mining sector.

2. INCIDENT TRACKING

Following an outline of the incident tracking methodology, this chapter elaborates on the nature of the main incident categories captured, namely accidents, violence and harassment, theft, pollution, corruption and child labour. This is followed by observations on authorities in Tanzania to which those affected reported incidents. In a final section, a number of key lessons will be drawn from piloting this incident tracking system.

2.1. Methodology

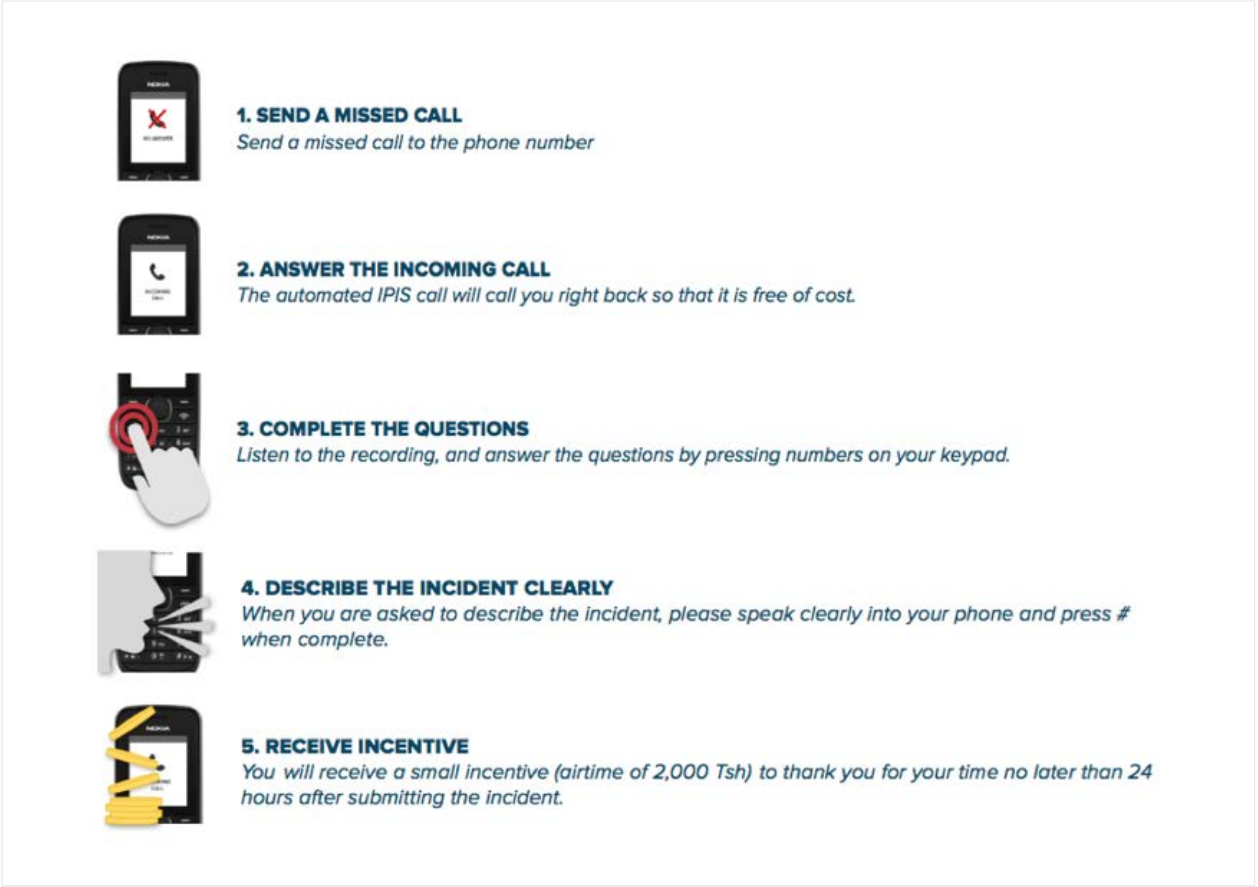
In the first phase of this project, IPIS undertook extensive mobile data collection campaigns to map artisanal and small-scale mining (ASM) sites and survey communities on how they perceive the impact of industrial mining. This covered four regions in northwest Tanzania, namely Geita, Shinyanga, Mara and Kigoma.

Throughout these campaigns, IPIS asked artisanal and small-scale miners and members of surrounding communities whether they would be interested to participate in this digital stakeholder engagement platform, and if so collected their phone numbers. This produced a dataset with around 800 respondents from – mainly gold – mining communities in northwest Tanzania.

As IPIS wanted to pilot this incident tracking system on a relatively small and manageable scale, we decided to continue with only a select group of between 15 and 25 **informants** per focal region. The full pool of 800 respondents was contacted to participate in the mobile surveys (see Chapter 3). As much as possible, these informants covered the main mining areas in each region. The selection was based on whether IPIS considered respondents as reliable, having good access to information and disposing over a broad network in the mining sector.

IPIS organised **trainings** for selected informants, 90 in total, in each region to ensure buy-in and explain the modalities of the platform. Tanzania's national human rights institution, the Commission for Human Rights and Good Governance (CHRAGG) participated in all trainings. This granted CHRAGG the opportunity to explain its mandate of handling citizen complaints on human rights and governance issues to key informants in the mining sector.

Informants could **signal incidents**, of which they witnessed the occurrence, impact or consequences, by giving a missed call to a dedicated phone number, upon which they received an automated call back through Interactive Voice Recording (IVR). This consisted of a pre-recorded questionnaire in Kiswahili, with which they interacted by, on the one hand, pressing a number in reply to a series of multiple-choice questions and, on the other, recording oral descriptions. Upon completion and verification of the incident report by IPIS' platform manager, informants got a small incentive of about USD 1 in phone credit to compensate for their time and effort.



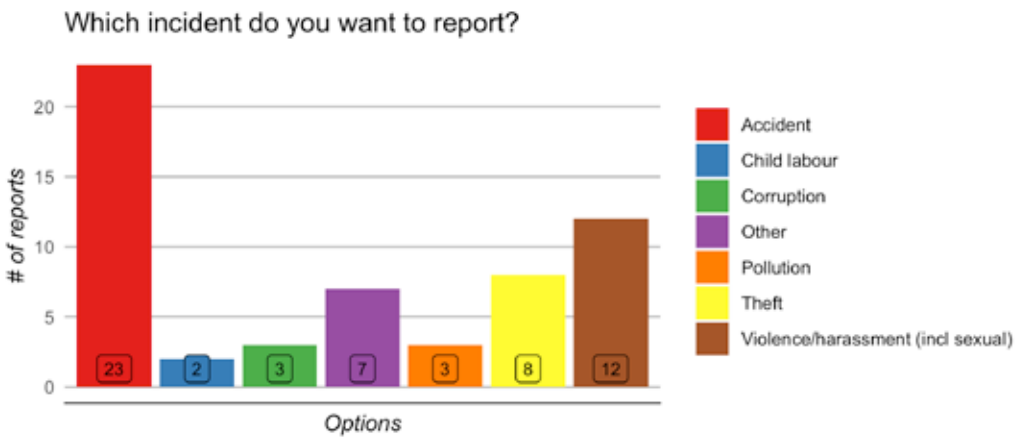
Instructions for informants on signalling incidents

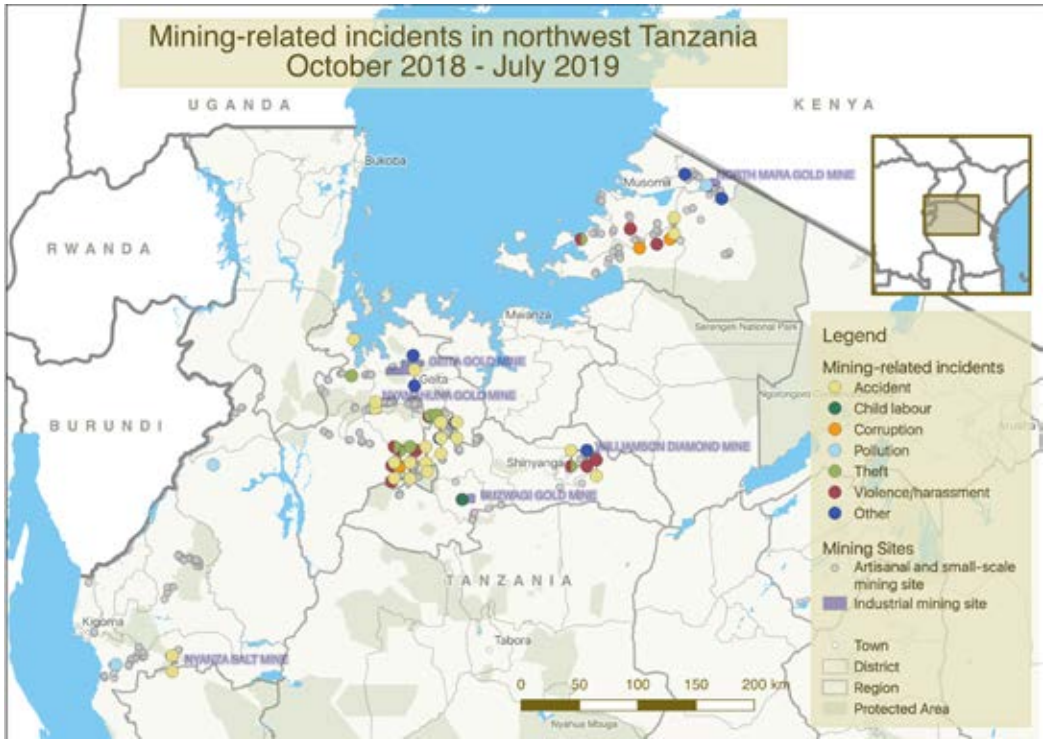
A first question asked informants to classify the incident. This was followed by a series of dedicated questions per incident category. The automated call ended with an opportunity for informants to orally describe the incident. The case management interface of the online platform designed by Ulula, subsequently allowed IPIS' Tanzania-based platform manager to anonymously interact with key informants to obtain further clarifications, categorise incidents, and track changes.

Structure of the IVR incident questionnaire

2.2. Reported incidents

30 informants reported a total of 54 incidents between October 2018 and July 2019. About three-quarters of these incidents were recent one-time events. The others were ongoing problems that started between a few days and over a year ago. The graph below shows that most informants signalled mining accidents (23 reports). This was followed by violence or harassment (12), theft (8), pollution (3), corruption (3), and child labour (2). Incidents that were reported under the category 'other' (7) diverged from rumours of mine site closure to delays in payment and family disputes.[1]



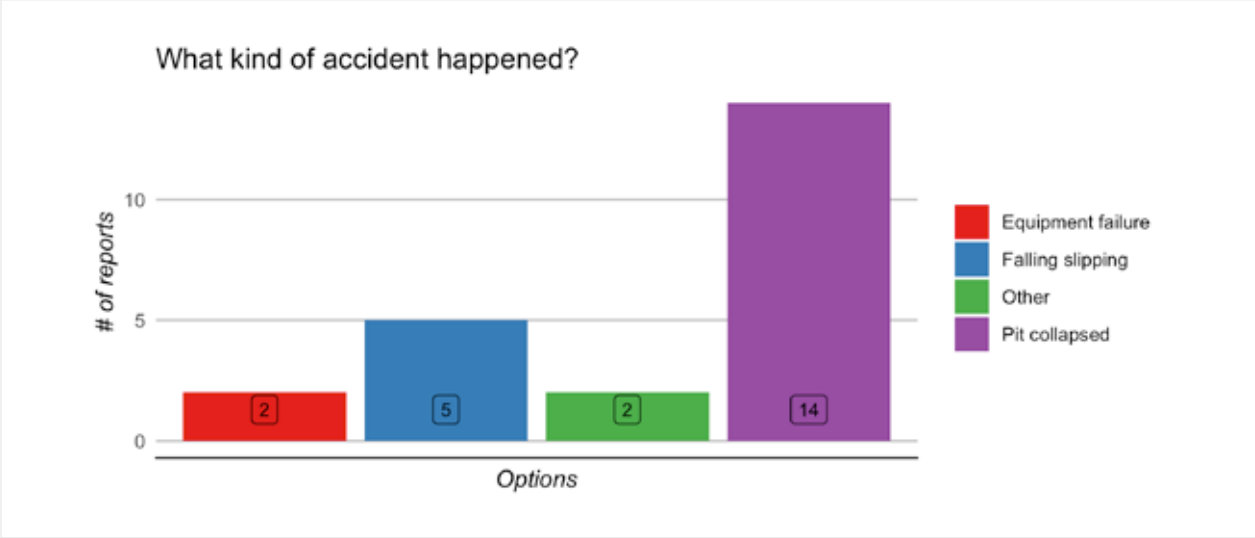


Map depicting incidents reported by informants between October 2018 and July 2019 in four regions of northwest Tanzania, namely Geita, Shinyanga, Kigoma and Mara

1 The sum of these numbers is more than 54, as some incidents fall under multiple categories.

2.2.1. Accidents

The most recurring type of accidents reported by informants are pit collapses (14 out of 23), followed by falling or slipping (5) and equipment failure (2). Safety awareness is generally low in artisanal and small-scale mining, with poor digging techniques and scant use of personal protective equipment.



The **collapse** of, often poorly constructed and reinforced, pits and shafts is a serious concern on many ASM sites. At worst, people are buried alive under earth and rocks, others get stuck for days and may suffer from dehydration, malnutrition or hypothermia. These risks are further exacerbated by the frequent use of explosives to break rocks for excavation, often without proper storage or evacuation plans. In a notable incident that was tracked in March 2019, 7 miners in Geita region died when an abandoned pit in which they intruded collapsed. The accident went unnoticed until local communities noticed the smell and started digging to recover the bodies.

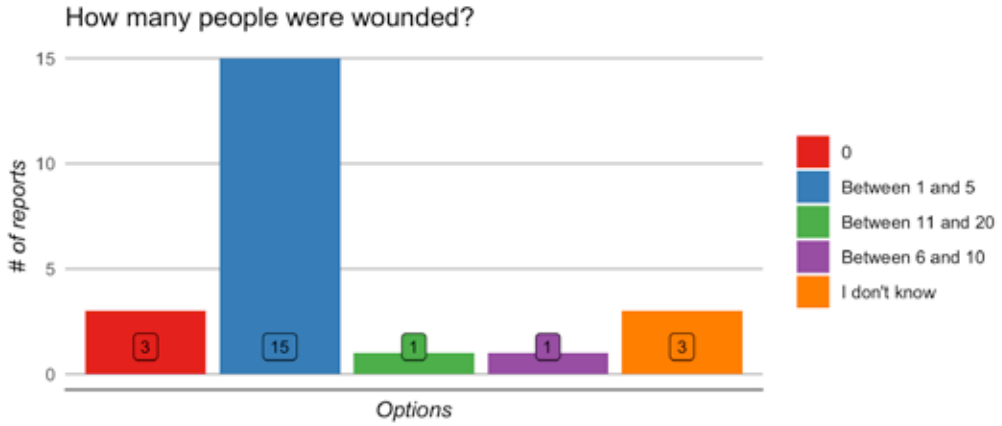
Miners are let down by rope in gold mining pits (Mara/Shinyanga, 2018 – Photo: IPIS)

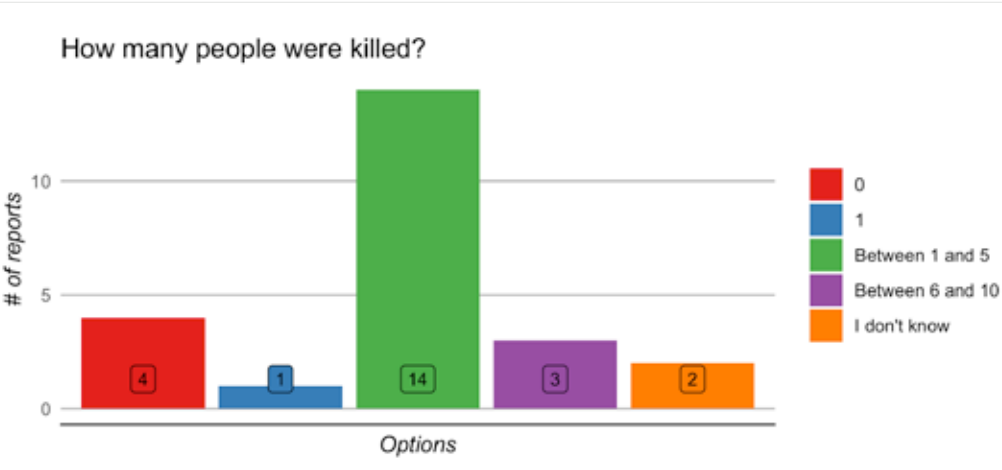
Another type of accident occurs when miners **fall or slip** while being let down by rope or climbing down on hands and feet in pits than can be over 100 meter deep. These accidents also involve miners or villagers falling in abandoned pits that are scattered across many ASM sites. Such pits are mostly uncovered and sometimes hard to see, as they may be overgrown by vegetation. One of the tracked incidents involved a child that died after falling into an abandoned pit on a salt mining site in Kigoma. Two reports concerned drunk miners that slipped while trying to enter a gold pit. One of them got seriously wounded and another passed away.

Accidents linked to the use or **failure of equipment** are also problematic. The most common problems are electrocution or undiligent use.

As the graphs below show, accidents regularly lead to **injuries, and fatalities** are no exception. Most fatal are pit collapses (57% of reported pit collapses were fatal) and the falling or slipping of miners in pits (40% of these accidents were fatal).

Uncovered abandoned pits scattered across a gold mining rush site in Shinyanga (Shinyanga, 2018 – Photo: IPIS)





2.2.2. Violence and harassment

In total 12 cases of violence or harassment were tracked. Over half (seven) were incidents **between mine workers**, often between diggers and pit owners or diggers and license holders.[2] Four of these were violent events leading to injuries, three involved non-violent conflicts, including the harassment of miners by their leadership. Most of these cases were escalated disagreements over payments or distribution of income or production. At one mine site in Geita, for instance, diggers violently revolted against pit owners that were refusing to compensate them for the long hours they were forced to make.

Four cases involved **violence between miners and others**, including thieves and security guards. Three of these were incidents of theft, whereby the thief was caught and severely beaten by miners or community members. In two instances this violence was fatal for the thief. Another case, reported in April 2019, involved private security guards fatally shooting two intruders looking for leftover minerals among waste material on a large-scale mining concession in Shinyanga.

Finally, one informant reported the **sexual abuse** of a five-year old child on a mine site in Shinyanga. This further led to considerable anger among community members.

2.2.3. Theft

Over the nine-month reporting period, eight incidents of theft were tracked. Small-scale miners were most frequently the victim of this crime. Thieves mainly took minerals, equipment, timber and cash. As mentioned above, it is not rare (three out of eight cases) that theft leads to violence, as miners and communities regularly get rough with thieves when they manage to catch them. For example, in one case a mining machine was stolen and the community was mobilized by the owner to find it back. When the thief was found he was beaten by the community and eventually succumbed to his injuries.

That small-scale mining attracts crime is also confirmed in an IPIS' survey of ASM sites in northwest Tanzania. This study concluded that 42% of miners and processors were working on a site that was struck by at least one incident of theft in the past year. Some of these incidences were particularly violent, involving thieves armed with machetes or even guns. The study noted two separate incidents in Mara and Kigoma, where several miners were killed during a raid.[3]

2.2.4. Pollution

Waste material, fuel spills, chemicals and exhausts regularly pollute soil, air and water in and around mining and processing sites. Water pollution is a particular concern in northwest Tanzania because it affects rivers that in their turn discharge their waters in Lake Victoria, which is Africa's most important source of inland fishery production.[4]

2 For a description of these functions, please see: H. Merket, Mapping Artisanal and Small-Scale Mining in Northwest Tanzania: A survey on its nature, scope and impact, (IPIS, Antwerp, 2019), pp. 27-29.
3 H. Merket, *Mapping Artisanal and Small-Scale Mining in Northwest Tanzania: A survey on its nature, scope and impact,* (IPIS, Antwerp, 2019), p. 60.
4 M. Njiru et al., 'An overview of the current status of Lake Victoria fishery: Opportunities, challenges and management strategies', *Lakes & Reservoirs: Research and Management*, 2008, 13, pp. 1-12.

Mineral processors on the shores of Lake Victoria (left) and artisanal salt mining on the shores of the Ruchugi river (right) (Mara/Kigoma, 2018 – Photo: IPIS)

Three cases of **water pollution** were tracked on the platform. One of these concerned a leakage from a large-scale miner's tailing storage dam in Mara that was affecting surrounding communities. Two other cases involved mine waste and oil spills from small-scale mining activities, polluting rivers in Kigoma. Pollution is likely underreported because it is often less visible, tangible and time-bound than other incidents like accidents or violence.

Diesel spills from a generator on a mineral processing site (Mara, 2017 – Photo: IPIS)

2.2.5. Corruption

Informants signalled three **diverse cases of corruption**. One case involved alleged extortion of small-scale miners by corrupt government officials. A second report related to collusion between small-scale license holders and local politicians to embezzle mining income to the disadvantage of diggers. A final case involved fraud by a pit owner to avoid paying royalties and taxes to authorities. As corruption is often latent and spread over long periods of time it can be expected that numerous cases go unreported. Therefore, it is hard to get a good view of the nature and scope of this problem in Tanzania's mining sector through this incident tracking system.

2.2.6. Child labour

On two occasions informants reported incidents of child labour. Both cases concerned groups of between 11 and 20 children, younger than 15, that were processing gold ore with toxic **mercury** on ASM sites. This is concerning as children are particularly vulnerable to mercury poisoning (see further section 3.5.).

Child labour is in all likelihood underreported in this system, as informants may not perceive children working at the mine site as sufficiently urgent to lodge an incident report, or find it hard to determine their age with a sufficient degree of certainty. In 2014, the National Bureau of Statistics estimated the number of children between 5 and 17 years engaged in ASM at 30,827, or 5% of the total workforce.[5]

Child resting on a bag of ore next to a ball mill on a gold processing site (Geita, 2018 – Photo: IPIS)

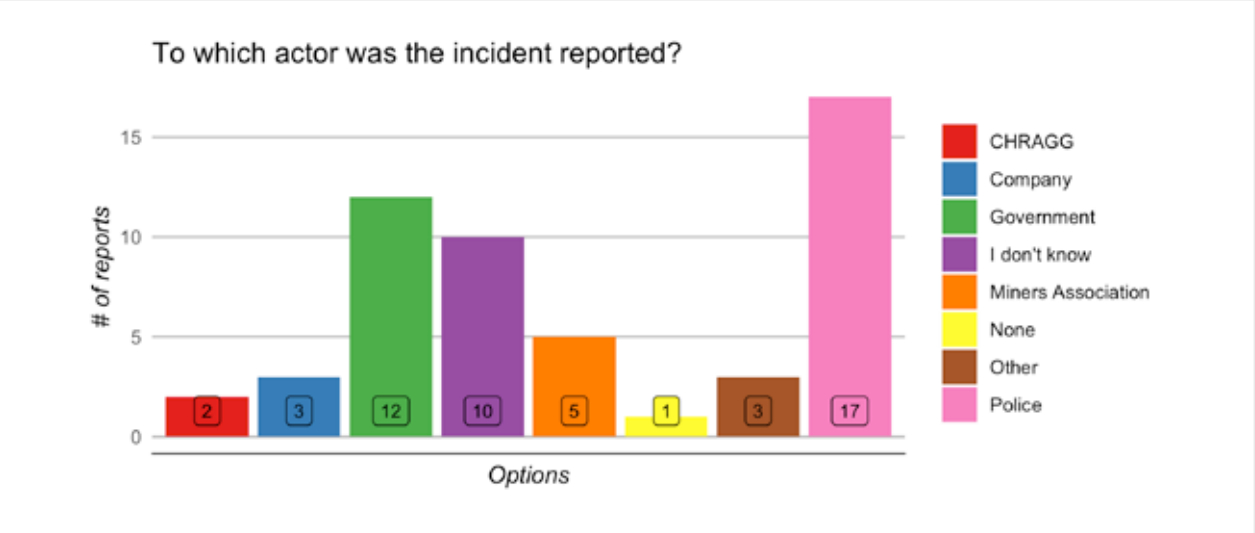
Besides the hard and demanding work, engagement in the ASM sector implicates serious health risks for children. The implementation of sensitisation programs accelerated since 2013, after a study from Human Rights Watch, put the spotlight on child labour in Tanzanian mines.[6] There are indications that these efforts are gradually leading to a reduction in the number of children working in mining. However, sensitisation has largely overlooked processing sites, where the widespread use of mercury involves considerable health risks. This is reflected in the data IPIS gathered between 2017 and 2018 on ASM in northwest Tanzania: only 4 children were observed while working on a mine, compared to 140 on processing and 180 on combined processing and mining sites.[7]

2.3. Reporting of incidents to authorities in Tanzania

When signalling an incident, informants were asked to provide information on which **authorities** in Tanzania were notified about the incident. Most cases were reported to the police (32%), followed by government services such as local government authorities or Resident Mining Offices (23%), regional small-scale miners' associations (9%), companies (6%) or the Commission for Human Rights and Good Governance (4%). CHRAGG is Tanzania's autonomous human rights institution. It has a mandate to re-

5 Tanzania National Bureau of Statistics, *Tanzania Integrated Labour Force Survey*, 2014.
6 Human Rights Watch, Toxic Toil: Child Labor and Mercury Exposure in Tanzania's Small-Scale Gold Mines (HRW, New York, 2013), 96p.
7 H. Merket, *Mapping Artisanal and Small-Scale Mining in Northwest Tanzania: A survey on its nature, scope and impact,* (IPIS, Antwerp, 2019), pp. 47-49.

ceive, register and investigate complaints from victims of human rights violations.[8] That only two incidents were reported to CHRAGG is likely due to the fact that many miners are insufficiently aware of the existence or mandate of this institution.



IPIS found that the majority of informants who reported incidents were satisfied with the **follow-up** authorities provided to those affected. This came out of qualitative supplementary conversations with 21 out of 30 informants on their experiences after reporting an incident.

Satisfaction was **highest** in the case of accidents and violence, which were mainly reported to police, local government authorities, Resident Mining Offices and regional miners' associations. Police and local authorities were reported to be quick in rescue operations, securing the site, evacuating casualties and restoring order, while mining offices and associations assisted in enhancing safety conditions or mediating between conflicting parties.

Informants indicated considerably **less satisfaction** regarding follow-up of theft, corruption and child labour reports. Regularly, authorities do not manage to catch thieves and many cases are closed for lack of evidence. Corruption is often not reported out of fear for retaliation, and if it is, informants lament that no measures are taken to follow-up on complaints. Child labour, equally, is allegedly a low priority for authorities.

2.4. Lessons learned

Besides getting a better understanding of the nature and scope of incidents in Tanzania's mining sector, this short-term pilot sought to test and try the potential of a mobile incident tracking system. This section therefore sets out the main lessons learned from designing and implementing this platform.

Firstly, given the scope and objectives of this pilot, it was important to work with a relatively **small group of informants**. It allowed IPIS to meet all informants in person, organise trainings to explain technicalities and manage expectations. This was key for an exercise that mainly served analytical purposes, and where the potential for immediate follow-up was limited. Yet, working with such a small group evidently had a number of key shortcomings. For one thing, the analysis of results is only indicative of certain tendencies and cannot provide a representative view. For another, working with informants in most cases implied that the link with those affected by the incident was indirect.

In order to exploit the full potential of a digital incident tracking platform for the mining sector, it would need to be **opened up to the wider public**. This requires extensive awareness-raising campaigns to make the platform known and regularly remind people of its existence. As in-depth training of individual

8 https://www.chragg.go.tz/index.php/who-we-are/78-about-chragg.

users may no longer be feasible, the user interface might need further simplification. This could be done by using the pilot's experience to shorten the number of questions and answer options of the incident report and ensuring a more hands-on and interactive follow-up by case-managers.

This pilot was also used to experiment with the **follow-up of incidents by relevant Tanzanian authorities**. The cooperation with CHRAGG proved particularly useful. As mentioned, CHRAGG participated in all regional informant trainings, which provided an opportunity to improve its visibility and network in the mining sector. CHRAGG was given direct access to the platform which allowed it to view incoming incident reports. This directly led CHRAGG to undertake a number of fact-finding missions to get a more complete picture of some particularly concerning reports. This is likely to be followed-up by several mediation and education missions in the near future. The Ministry for Minerals also has a log-in to the platform and expressed particular interest in the platform's potential for prompt accident detection.

IPIS conducted brief qualitive follow-up surveys with informants to inquire about their experiences with the platform. All surveyed informants agreed on the **added value** of such an incident tracking system. Three issues in particular were highly appreciated.

Firstly, informants were most outspoken in valuing the *anonymity* of the system. Many informants indicated that numerous incidents currently stay under the radar because those affected fear retaliation by their bosses, by perpetrators or by authorities. This would be particularly the case for incidents of corruption, violence, theft and – to a lesser extent – child labour.

Secondly, various informants valued the *popular, egalitarian* nature of the system. Reportedly, many incidents that are currently on the radar of authorities are those reported by the elites in the mining sector, such as license holders and site managers. They tend to have most means and connections to access (local) government authorities. Yet, they sometimes also have an interest in keeping quiet about incidents that may negatively affect their business. Accidents, for instance, might lead to closure of sites or necessitate costly investments in safety precautions. Some informants mentioned that this is leading to cover-ups, at the expense of worker safety. A mobile incident reporting system is easily accessible for everyone with a mobile phone, and might help to end such underreporting.

Finally, and related to the above, a number of informants stressed *accessibility* as one of the key strengths of this system. The mobile nature of the platform cancels challenges of remoteness. Besides local government authorities, offices of dedicated state services are often only present in big towns. For instance, there are only five Resident Mining Offices in this project's four focal regions (the combined surface of which is three times the size of Belgium). In the light of such challenges, informants particularly valued the platform's interface enabling live anonymous interaction with the case handler.

Informants also indicated a number of **issues for improvement**. In the first instance, a number of them requested more regular *feedback on progress* and follow-up. This would help them understand what is being done with their report and stimulate informants to continue using and promoting this platform. Secondly, several informants pointed to *technical problems* with the reporting line. Due to challenges with telecommunication in Tanzania, informants did not always manage to report an incident immediately. While part of this challenge is beyond the reach of operating such a platform, it is important to, as much as possible, sort out such challenges with telecom operators before implementation.

At present, IPIS does not have a concrete outlook on launching an expanded incident tracking system for Tanzania's mining sector. Yet, a number of these lessons learned are already **inspiring other similar exercises**. On the one hand, as part of a project funded by the European Instrument for Democracy and Human Rights, IPIS is working with CHRAGG to improve the institution's mobile complaint handling system. Both the technical and substantive experiences of this pilot are guiding the design and operation of CHRAGG's system to make it as effective and efficient as possible. On the other hand, IPIS is putting some of these lessons in practice in the form of an open incident tracking platform in DR Congo. This is done in close cooperation with local civil society organisations that are directly engaged in providing follow-up to those affected.[9]

9 For more information, please see: *http://ipisresearch.be/2019/06/artisanal-small-scale-mining-incident-tracker-eastern-drc/*.

3. MOBILE SURVEYS

The stakeholder engagement platform of this pilot included the possibility of sending out mobile surveys to the around 800 respondents that agreed to participate. This chapter first briefly outlines the methodology of the mobile surveys. This is followed by a presentation of the main survey results. A final section includes the key lessons learned of designing and operating a mobile survey system.

3.1. Methodology

The mine and community visits that were undertaken in the first phase of this project provided rich contextual information on the socio-economic and human rights impact of mining. Yet, such visits are also time and cost-intensive and can only provide snapshots of information at specific moments in time. Therefore, IPIS sought to test this platform as a complementary way to **build a more continuous data flow** in a resource-efficient way. This served to enrich IPIS' large datasets on the nature, scope and impact of ASM, and on community perceptions regarding industrial mining. Furthermore, whilst the unit of analysis in IPIS' field surveys were mine or processing sites and villages, these mobile surveys allow to complement this with individual perspectives of miners and villagers.

Four relatively short **surveys** were developed and sent out consecutively between December 2018 and May 2019. This was again operated through IVR, or automated calls. The surveys were broadcasted through the platform upon initiation by IPIS. These respectively surveyed socio-economic conditions of miners, motivations to mine, impact of mining and mercury use. Surveys were designed in an interactive way, meaning that the answers to each question determined the next one. This mainly served to keep surveys as brief as possible, in order to increase the response rate. For the same purpose, completed questionnaires received an incentive of around USD 1.

The mobile surveys were sent indiscriminately to all respondents. They are self-explanatory and therefore did not require any particular training or instruction.

In light of the relatively **small sample size**, it is important to re-emphasise that the value of these results lies in highlighting certain tendencies, rather than in the absolute numbers and values these represent

3.2. Socio-economic situation of miners

A first survey questioned **respondents** on their socio-economic situation and had a response rate of about 25% (195 out of 800 respondents). As set out in the previous chapter, respondents were selected from mining communities. The majority are people working in artisanal and small-scale mining (76%), but respondents also include villagers living around small or large-scale mining areas (24%).

In ASM, salaries are exceptional, as the **distribution of revenue** is mainly arranged informally. This is based on production sharing agreements, whereby each actor gets an informally agreed share of production. The precise distribution formula settled in such production sharing agreements is site or even pit-specific. Based on IPIS study on ASM in Tanzania, the rule of thumb across surveyed mines is 30% for site management and/or license holder(s), 40% for pit owners and 30% to be distributed among diggers.[10]

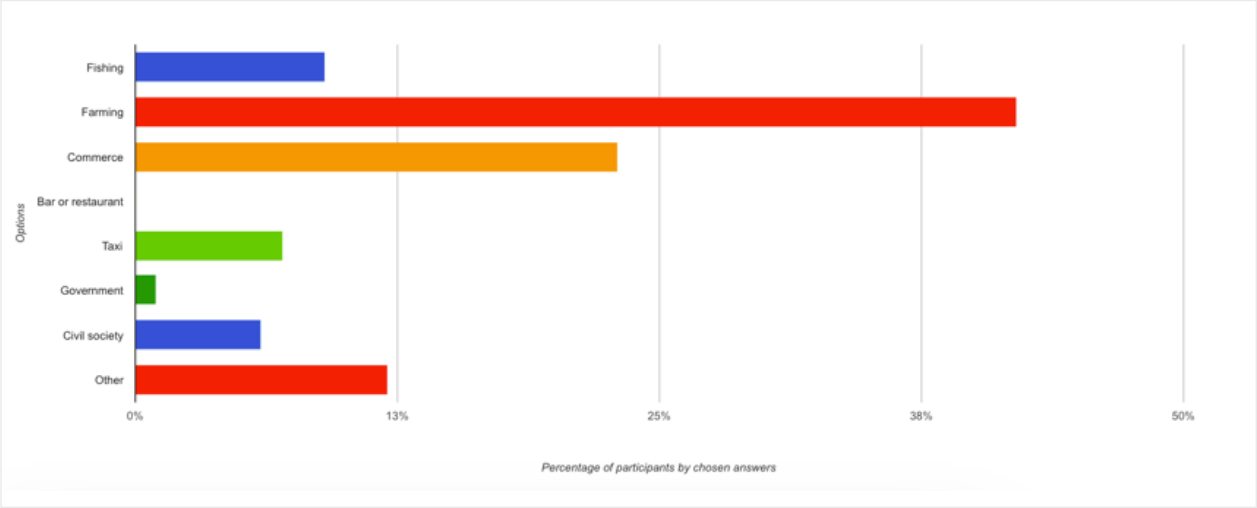
The results of the mobile surveys indeed indicate that, on average, diggers earn less than licence holders and pit owners. 60% of diggers claim to **earn less than TZS 100.000** (ca. USD 42) in a typical month, compared to 48% of licence holders, pit owners and site managers.

That being said, similar percentages of mine workers in different functions assessed their income from mining as **insufficient to cover basic living costs**, namely 64% of diggers and 61% of pit owners, license holders and site managers.

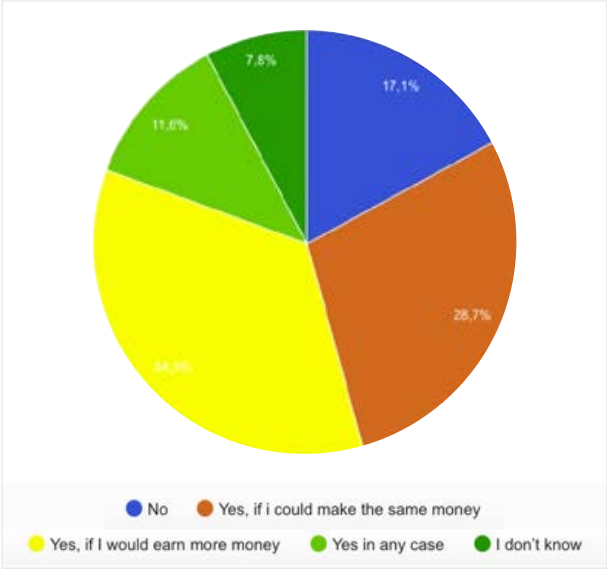
For these reasons, as well as the complications of mining, processing and transport during the rainy season, many miners complement their mining income with **other economic activities**. This is the case for 51%

10 H. Merket, *Mapping Artisanal and Small-Scale Mining in Northwest Tanzania: A survey on its nature, scope and impact,* (IPIS, Antwerp, 2019), pp. 40-43.

of all respondents working in mining. As shown in the graph below, most seek additional employment in farming (43%), followed by commerce (22%).



Nonetheless, the data reveals that mining offers a **relatively rewarding source of employment** in rural Tanzania. 47% of respondents working in the mineral sector reported to earn more than TZS 100.000 per month. One-third reported a monthly average above TZS 200.000 (ca. USD 85). As a reference, the Food and Agriculture Organisation (FAO) estimated the average wage for agricultural labour in Tanzania at TZS 110.000 a month.[11]



The large majority of miners (63%) has been engaged in the sector for more than three years; nearly one-third even for longer than six years. Still, 75% of miners responded that they would **quit mining** if they could find another job opportunity. For 35% this was only the case if they would earn more money than in their current job. Yet, on the other hand, of those respondents that are not currently engaged in mining, only one in five does not at all consider to try their luck in the sector. The next section will further unravel the motivations to start, continue or quit mining.

3.3. Motivation to be engaged in mining

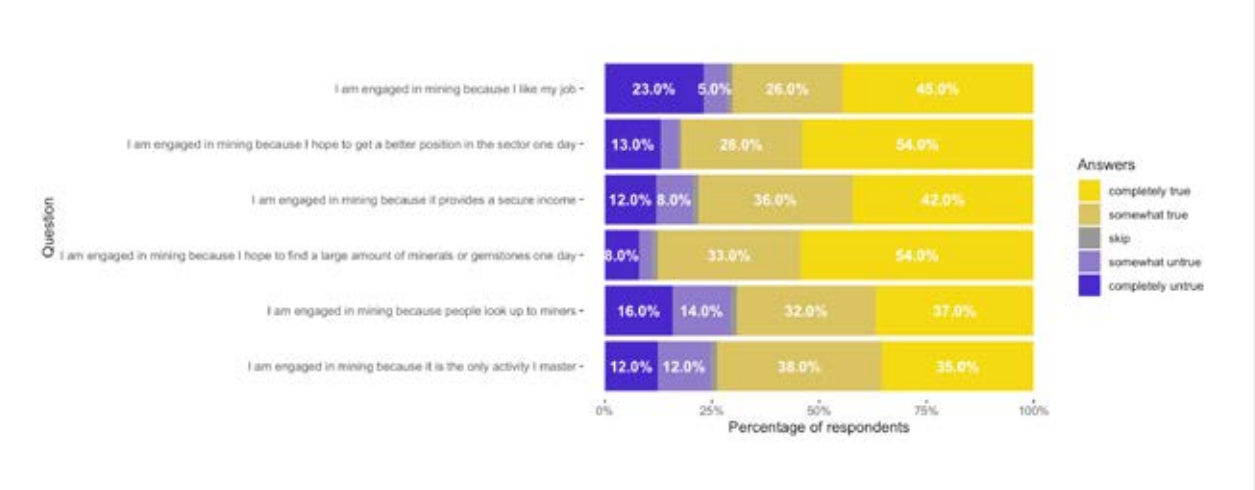
The first mobile survey sketched a rather mixed picture on the socio-economic situation of miners. The second survey assesses why people are engaged in mining. This survey, with again a response rate of about 25% (202 respondents), made clear that it is in any case **not a mere poverty-driven activity** where people are pushed into for lack of other opportunities.

154 respondents (76%) are engaged in mining. In general, the large majority of this group (70%) hopes to still be engaged in the sector in 5 years from now.

Miners were presented with a series of statements they could rate from completely true to completely untrue. The responses to these questions reveal that miners' most important motivation is the hope of **finding a large amount of minerals** one day. In total 87% of miners agreed with this statement, with 55% rating it as completely true and 32% as somewhat true.

11 G. Rapsomanikis, *The economic lives of smallholder farmers: An analysis based on household data from nine countries* (Food and Agriculture Organisation, Rome, 2015), p. 25.

This is followed by the hope of climbing the ladder and getting a better position in the sector (82%), the secure income provided by mining (76%) and the realisation that mining is the only activity they master (73%). Equally important to note is that the majority of miners likes their job (68%). While responses are less outspoken, still 60% of miners totally or somewhat agreed that they are engaged in the sector because people look up to miners.



At first sight, there appears to be somewhat of a **contradiction** between these motivations to mine and the observation that 62% of miners find their income insufficient to cover basic living expenses (see section 3.2.). A possible explanation is that other accessible livelihood opportunities, such as farming or small commerce, generally do not provide more revenue stability and often require higher investments to make an entry in the sector.

For those respondents not engaged in mining the most important pull factors are the nature of the job (68%) and the hope of 'big finds' (64%). The security of income (45%) and the prestige of mining (30%) are considerably less convincing for **non-miners**. On the other hand, the most important reason for staying away from mining is its negative health impact (64% of non-miner respondents).

3.4. Impact of mining on its surroundings

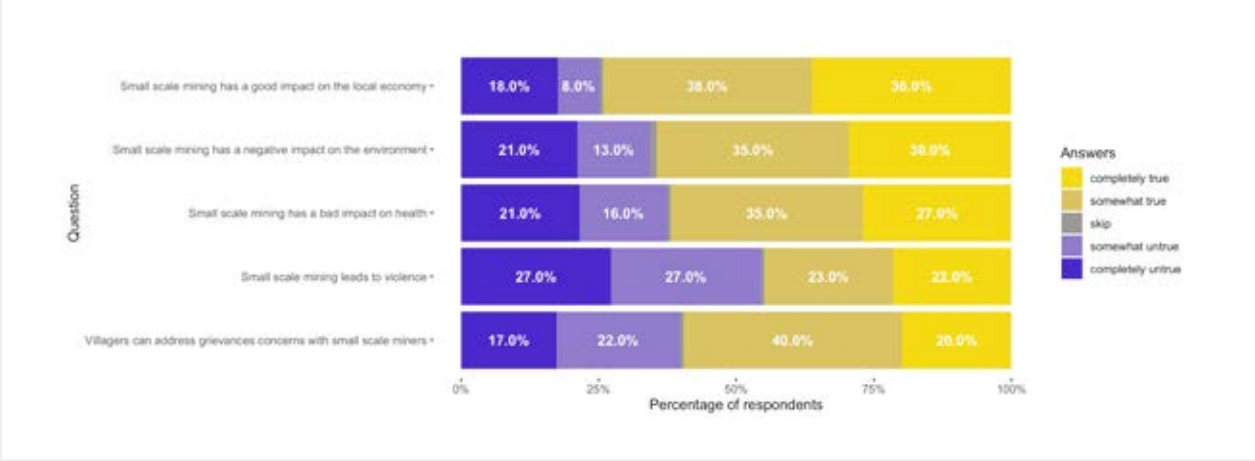
A third survey sought to assess how respondents perceive the impact of mining. They were again asked to rate a series of questions, separately for ASM and large-scale mining (LSM). Nearly 25% of contacts (180) participated in the survey.

3.4.1. Impact of ASM

For what concerns ASM, the results are most decided regarding its **positive impact on the local economy**. A large majority of respondents (74%) agrees either somewhat (38%) or completely (36%) with this statement. This confirms what various studies have demonstrated,[12] including IPIS' research on ASM in northwest Tanzania. This found that ASM offers a key livelihood and business opportunity to a significant part of the population in resource-rich areas. This study moreover highlighted that corporate social responsibility (CSR) contributions by ASM deliver important support to basic needs projects in many ASM-surrounding communities.[13]

12 R. Bazillier and V. Girard, "The gold digger and the machine. Evidence on the distributive effect of the artisanal and industrial gold rushes in Burkina Faso", *LEO Working Papers / DR LEO 2545* (University of Orleans, 2017), 53p); C. Kinabo, 'A socio-economic Study of Small-Scale Mining in Tanzania', in G. M. Hilson, *The Socio-Economic Impacts of Artisanal and Small-Scale Mining in Developing Countries* (CRC Press Technology and Engineering, 2006), pp. 271-293).

13 H. Merket, *Mapping Artisanal and Small-Scale Mining in Northwest Tanzania: A survey on its nature, scope and impact,* (IPIS, Antwerp, 2019), pp. 43-44

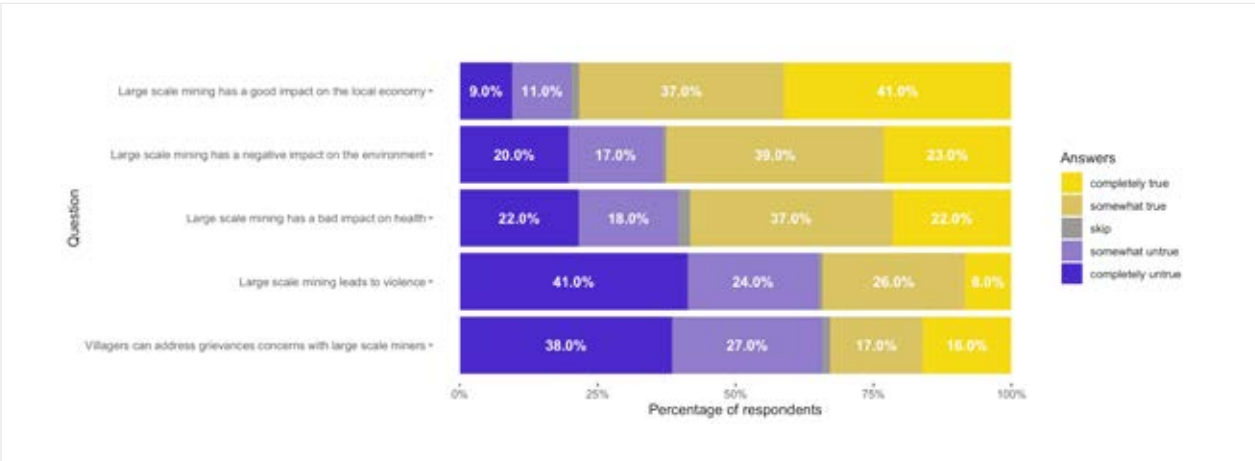


At the same time, 65% of respondents answered that ASM has a **negative impact on the environment** and 62% said that it has a **bad impact on health**. It is also worrisome – all the more given that the majority of respondents are active in ASM – that almost half of them either somewhat or completely agreed that ASM **leads to violence**. Slightly more positive is that a small majority (60%) found that villagers can **address their grievances** with small-scale miners.

The impact of ASM reflects some of the findings of the different surveys described in this report: ASM is an important income generator (see section 3.2. and 3.3.), but at the same time has a negative impact on the environment and health (see section 3.5.).

3.4.2. Impact of LSM

The above-described responses on the impact of ASM are largely comparable to those regarding the LSM sector. 78% of respondents either somewhat or completely agree that LSM has a **good impact on the local economy**. This confirms the finding in IPIS' study of communities around six industrial mines in northwest Tanzania. This study found that villagers associate various benefits with having a large-scale miner operate in their proximity. Most dominant are community investments and employment generation, both directly and indirectly.[14]



Yet, 62% found it somewhat or completely true that large-scale mining companies have a **negative impact on the environment**. About the same proportion of respondents (59%) agreed that it has a **bad impact on health**. 34%, considerably less than what was the case for ASM, **associate LSM with violence**.

14 H. Merket & E. Foubert, *Dissecting the Social License to Operate: Local community perceptions of industrial mining in northwest Tanzania*, (IPIS, Antwerp, 2019), pp. 33-39.

These results illustrate the duality of communities' stance towards LSM: widely appreciated for its impact on the economy, but deplored for the harms it brings to environment and health. In the light of such concerns it is problematic that only one-third of respondents somewhat or completely agrees that villagers can **bring grievances to the attention of mining companies**. This is the most pronounced difference with how respondents evaluate ASM. While it should be considered that the majority of respondents stem from ASM communities, this finding confirms the conclusions of IPIS' previous studies. On the one hand, ASM is closely embedded within these communities. Numerous inhabitants either directly or indirectly depend on the sector to sustain their income. Furthermore, representative bodies such as regional miners' associations and cooperatives play an active role in preventing and mediating conflict.[15] On the other hand, IPIS' study on community perceptions regarding LSM points to a widespread feeling that companies or isolated entities that fail to provide accountability and redress for community grievances.[16] This is problematic as unresolved harms typically aggravate, raise tensions and thereby create a downward spiral of distrust and conflict.

3.5. Use of mercury

A fourth and final mobile survey focusses on the use and impact of mercury in mining communities. It had a response rate of nearly 30% (227 respondents).

Artisanal and small-scale **gold processors** often use mercury in the panning process to separate the mineral from its ore. Mercury amalgamates with gold, and upon subsequent burning, the mercury evaporates and the gold residue remains. The use of this chemical in ASM is widespread in Tanzania because of its ease, affordability and availability.

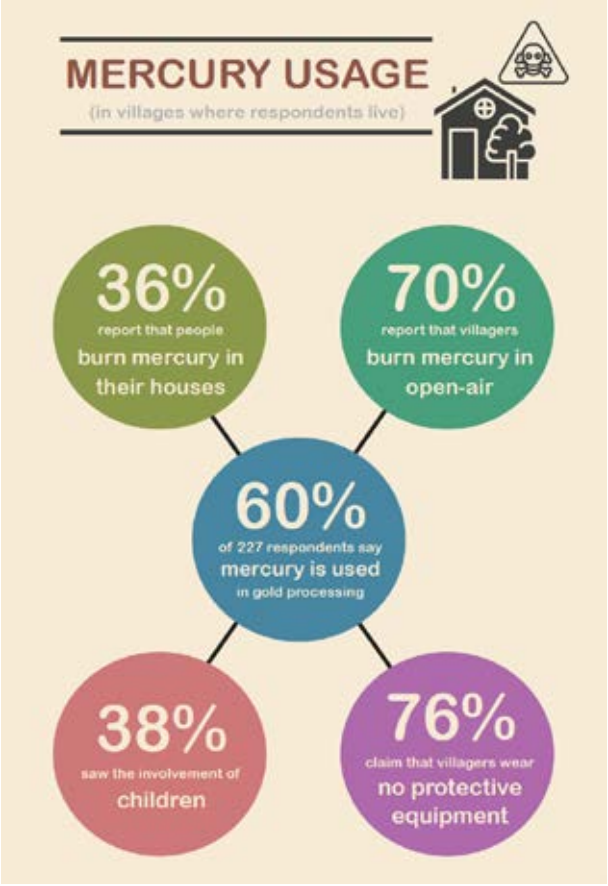
Mercury is however a **highly toxic** chemical that contaminates water, soil and air. It accumulates in the human body after inhaling its vapour or fumes, by contact, or by consuming mercury-contaminated fish, meat or crops.[17] Mercury poisoning is a slow process that builds up over months or years and gradually attacks the central nervous system. Mercury use is legal in Tanzania. Yet, most of the mercury circulating in ASM is in fact illegal**,** as it is smuggled into the country without the required approval by the Chief Government Chemist Agency.[18]

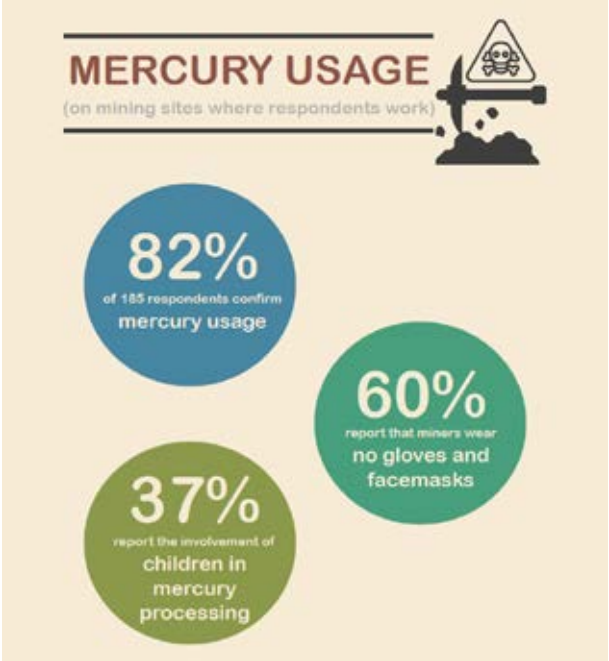
Processor using mercury to extract gold from its ore (Shinyanga/Geita, 2018 – Photo: IPIS)

15 H. Merket, *Mapping Artisanal and Small-Scale Mining in Northwest Tanzania: A survey on its nature, scope and impact,* (IPIS, Antwerp, 2019), pp. 59-60.
16 H. Merket & E. Foubert, *Dissecting the Social License to Operate: Local community perceptions of industrial mining in northwest Tanzania*, (IPIS, Antwerp, 2019), pp. 44-52.
17 S. Bose-O'Reilly et al., 'Health assessment of artisanal gold miners in Tanzania', *Science of The Total Environment,* 2010, 408(4), pp. 796-805.
18 COWI, *Mercury trade and use for artisanal and small-scale gold mining in sub-saharan Africa* (World Bank, 2016), pp. 26-33.

Despite its highly toxic character, 82% of the 185 respondents engaged **in mining** (the bulk of them working on gold) said that mercury was used on the site where they work. 60% reported that processors on these sites do not generally wear **protective equipment** such as gloves and facemasks when working with mercury. Notably, 37% responded that **children** were involved in mercury processing on their site. This corresponds with the finding of IPIS' ASM survey that nearly all ASM gold processing sites use mercury, and 18% of them engage children below the age of 15.[19]

60% of all respondents to this mobile survey said to have witnessed the use of mercury in gold processing **in their village**. In 70% of these cases, people were reportedly **burning** the mercury-gold amalgamate **in open air**. This implies that no devices were used to capture mercury vapour (such as retorts), thereby releasing the toxic fumes to the atmosphere. When burning is done next to places where children live and play, women prepare food, and households do subsistence farming, the risk of mercury poisoning is severe.





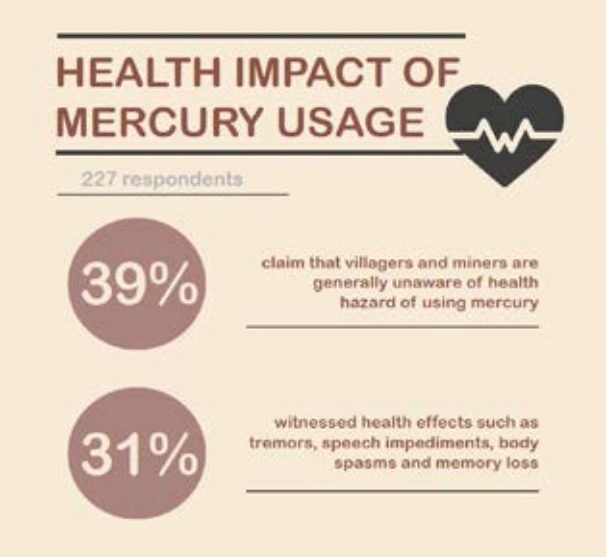
Retort used to capture and recycle mercury fumes during the burning of the amalgamate (Geita, 2019 – Photo: IPIS)

Strikingly, in 36% of villages where mercury use was observed, respondents indicated that people were burning mercury **inside their houses**. This evidently further increasing the chances of inhaling toxic mercury fumes. The vapour can moreover be absorbed by ceilings and walls, causing long-term exposure to those living and sleeping in these places.

Only 24% of respondents that observed people processing mercury in their villages saw them wearing **protective equipment**. In 38% of cases, **children** were allegedly involved in mercury processing in these villages. This figure is comparable to what respondents reported on the extent of involvement of children in working with mercury on processing sites.

19 H. Merket, *Mapping Artisanal and Small-Scale Mining in Northwest Tanzania: A survey on its nature, scope and impact,* (IPIS, Antwerp, 2019), pp. 47-48 and 54-57.

Respondents were also questioned on the **health impact** of mercury. 31% indicated to have personally witnessed health effects of mercury use, such as tremors, speech impediments, body spasms or memory loss among those working with the chemical. 37% of respondents did not witness any such health effects, and 31% was not sure. Despite an increasing number of awareness-raising campaigns by miners' associations, civil society and government authorities, 39% of respondents believed that people are generally not aware that mercury causes such health effects.



3.6. Lessons learned

The experience with designing and operating this mobile survey system, equally allows to draw a number of lessons.

Firstly, in order to draw more solid conclusions, the **sample** size needs to be larger and the selection of respondents more randomised. This would moreover make it possible to cross different variables. In this manner, it could be assessed how indicators such as a person's age, position in the mining sector, or the proximity of communities to small or large-scale mining areas, impact survey results, something which was not possible with the current sample.

Secondly, the synergies and comparisons with the rich data from IPIS' field visits proved essential. Mobile surveys can provide large amounts of data, but **little context**. In order to better understand the reasons behind certain answers or grasp the broader context, it is important to complement these with traditional field research.

Finally, **incomplete survey replies** considerably reduce the response rate. In order to avoid that respondents drop out during a call, it is important to keep surveys both concise and simple. Ideally, a mobile survey should not take longer than three minutes, and respondents should be informed of that duration from the outset. It is best to stick to between five and seven questions and keep answer options brief and straightforward.

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