

Rapid Health Situation Assessment Report

Mozambique

Piloting a New WHO Framework to Support the Development of Public Health Strategies on Artisanal and Small-scale Gold Mining in the Context of the Minamata Convention on Mercury

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Contents

List of figures	v
List of tables	vi
Abbreviations	vii
Section	
1 Background	1
Artisanal and small-scale gold mining and health	2
The Minamata Convention	2
Study rationale	3
Political linkages and political involvement in Mozambique	3
<hr/>	
2 Aim and objectives	5
<hr/>	
3 Methodology	7
Study design	8
Study sites	8
Study population and sample size	9
Community mobilisation and sensitisation activities	10
Data collection and tools	10
Data management	11
Ethical considerations	12
<hr/>	
4 Literature review	13
<hr/>	
5 Field study findings	15
Study population	16
Community profiling	17
Environmental and socio-economic impacts of ASGM activities	27
Health-related issues in the ASGM context	30
Health system capacities and readiness	36
Institutional and stakeholder aspects	48
<hr/>	
6 Conclusions	51
<hr/>	
7 Recommendations	55
Recommendations at individual level	56
Recommendations at community level	57
Recommendations at institutional level (Ministry of Health)	57

Contents

References

59

Annexes

60

Informed Consent – Key Informant	60
Informed Consent – Focus Group Discussion Participant	62
KII Questionnaire – Government official	64
KII Questionnaire – Health authority official	65
KII Questionnaire – Environmental (health) authority official	67
KII Questionnaire – Health care provider	69
KII Questionnaire – Traditional Community Leader	71
KII Questionnaire – ASGM community leader	74
KII Questionnaire – Civil society organization representative	76
FGD semi-structured questionnaire – Artisanal and small-scale gold miners	78
FGD semi-structured questionnaire – Family members of artisanal and small-scale gold miners	81
FGD semi-structured questionnaire – ASGM community members (non-mining)	83
Health facility assessment questionnaire	85
Observational tool – ASGM site	85

List of figures

Figure 1: Methodological triangulation (adapted from Winkler et al. 2011)	8
Figure 2: Approximate location of ASGM sites	17
Figure 3: Mpapa village settlement seen from an ASGM mining site	18
Figure 4: Mining pit and gold processing site in one ASGM site	18
Figure 5: Cyanidation facility in one ASGM area	18
Figure 6: Mining pit at Munhena ASGM site	19
Figure 7: ASGM mountain site with various active mining pits being explored (extraction of hard rock-deposits)	23
Figure 8: Alluvional ASGM site (inactive)	24
Figure 9: ASGM site where processing, concentration, amalgamation and burning takes place (top) and heating crushed ore before milling (bottom)	24
Figure 10: Mill for crushing ore into fine powder	24
Figure 11: Tools for gold concentration and retention in mesh-net	25
Figure 12: Mercury contaminated tailings in unsafe retention ponds being collected for transportation to cyanide leaching site	25
Figure 13: Temporary living arrangements in ASGM mountain site	25
Figure 14: Mining pit with unsecured walls	26
Figure 15: Mining pit with secured walls	26
Figure 16: ASG miners lifting and carrying heavy loads (about 40 kg) from mining pit to processing site	26
Figure 17: Cup where amalgam is placed and heated to vaporize the mercury (open burning)	26
Figure 18: Logging and deforestation for the collection of solid fuel for ASGM use	28
Figure 19: Land degradation in abandoned alluvional mining location	28

List of tables

Table 1: Sites investigated in the country	9
Table 2: Target participant groups and target health facilities	9
Table 3: Sample sizes	16
Table 4: Key observational features of the selected ASGM sites	20
Table 5: Environmental impacts according to key informants	27
Table 6: Socio-economic impacts according to key informants	29
Table 7: Health issues according to key informants	31
Table 8: Health issues according to focus group participants	31
Table 9: Health risks and effects of ASGM according to key informants	33
Table 10: Health risks and effects according to focus group participants	34
Table 11: Health seeking behaviour of miners according to key informants	35
Table 12: Health seeking behaviour of miners according to focus group participants	36
Table 13: Capacities and readiness according to key informants	37
Table 14: Capacities and readiness according to focus group participants	37
Table 15: Capacities and readiness according to providers at local level	38
Table 16: Capacities and readiness according to providers at provincial level (Manica)	39
Table 17: Health facility assessment at local level	40
Table 18: Health system priority needs according to key informants	47
Table 19: Health system priority needs according to focus group participants	48
Table 20: Proposed community initiatives	49

Abbreviations

ASGM	Artisanal and Small-Scale Gold Mining
CV	Curriculum Vitae
DFID	Department for International Development
ERC	Ethics Review Committee
ETHZ	Swiss Federal Institute of Technology in Zurich
E4A	Evidence for Action
FGD	Focus Group Discussion
FMoH	Federal Ministry of Health
GAVI	Global Alliance for Vaccines and Immunization
GEF	Global Environment Facility
HFA	Health Facility Assessment
HIA	Health Impact Assessment
HSB	Health Seeking Behaviour
HQ	Headquarters
KI	Key Informant
KII	Key Informant Interview
LGA	Local Government Area
MIREME	Ministry of Mineral Resources and Energy
MITADER	Ministry for Land, Environment and Rural Development
MISAU	Ministry of Health
NADEL	Center for Development and Cooperation
NAP	National Action Plan
OHS	Occupational Health and Safety
RDT	Rapid Diagnostic Test
SARA	Service Availability and Readiness Assessment
SDC	Swiss Agency for Development and Cooperation
SME	Small and Medium Enterprises
SNF	Swiss National Science Foundation
Swiss TPH	Swiss Tropical and Public Health Institute
UN	United Nations
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Organization
WHO	World Health Organization

1 Background



In this section:

Artisanal and small-scale gold mining and health

2

The Minamata Convention

2

Study rationale

3

Political linkages and political involvement in Mozambique

3

Background

Artisanal and small-scale gold mining and health

Artisanal and small-scale gold mining (ASGM) is, broadly speaking, the exploitation of smaller gold deposits by individuals, small groups or small cooperatives (1). ASGM often is labour-intensive work using no or limited mechanization and may have low recovery rates. The sector is often characterized by low levels of capital, productivity, occupational safety, and limited access to land and trading markets. ASGM is practiced in over 70 countries worldwide. An estimated 10-15 million people are involved in ASGM, including 4-5 million women and 1 million children, whereas a further 80-100 million people's livelihoods are affected by ASGM (2, 3). ASGM is an important activity in many developing countries as it provides a primary and additional source of income, particularly in rural regions where economic alternatives to agriculture are limited. The ASGM sector is estimated to contribute about 25% of the global gold production (2).

ASGM-related health hazards can be categorized into chemical (e.g. mercury, cyanide, arsenic, lead), biological (e.g. water- and waste-related diseases, sexually transmitted infections), biomechanical (e.g. traumas, overexertion), physical (e.g. noise, low oxygen levels) and psychosocial (e.g. drug abuse, stress, fatigue) hazards (4).

Many countries are taking active steps to reduce and where possible eliminate the use of mercury in the ASGM process. However, due to its low cost, easy use and widespread availability, mercury amalgamation remains the preferred method employed in ASGM to extract gold. Consequently, mercury is used in ASGM in more than 70 countries and represents the largest global demand sector for mercury, with approximately 1,600 tons per year used. ASGM is also estimated to be the largest source of anthropogenic mercury emissions to the environment (5, 6).

The Minamata Convention

The Minamata Convention on Mercury, adopted in 2013, is an international environmental treaty designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds (7). The Convention was named after the Japanese city Minamata, which suffered a devastating incident of mercury poisoning. In paragraph 3 (a) of article 7, the Minamata Convention on Mercury obligates each Party that has more than insignificant ASGM in its territory to develop and implement a national action plan (NAP) in accordance with annex C to the Convention (7). Item (h) of annex C indicates that such NAPs must include a public health strategy on the exposure of artisanal and small-scale miners and their communities.

Such public health strategies must include inter alia, the gathering of health data, training for health care workers, and awareness-raising through health facilities. The World Health Organization (WHO) is developing guidance for health ministries to support the development of public health strategies on ASGM. However, the WHO guidance may also aid in the development of other NAP content required under annex C, especially item (i) which requires strategies to prevent the exposure of vulnerable populations, particularly children and women of child-bearing age, especially pregnant women, to mercury used in ASGM, and item (j) which requires strategies for providing information to artisanal and small-scale miners and affected communities.

This WHO initiative has been established in response to World Health Assembly Resolution 67.11, which recognizes the role of health ministries in supporting the implementation of the Convention and calls upon WHO to provide technical support in this regard. The WHO has thus developed a framework comprising a

suite of tools to support the development of public health strategies on ASGM. WHO set out to pilot the use of the framework and related tools in three African countries that (i) have extensive ASGM activities and (ii) are in the process of developing a NAP, namely Mozambique, Ghana and Nigeria.

Study rationale

The present study aimed at piloting the WHO guidance (in particular the study protocol and associated tools) for an assessment of public health challenges in an ASGM context. The specific objective of the health situation assessment was to generate initial evidence and information regarding priority health concerns of ASGM miners and their communities and to provide an initial understanding about available health systems capacities to respond to those health concerns. This information informs the selection of priorities and interventions to be reflected in the public health strategy of the NAP.

The health situation assessment was intended as a preliminary study, and was not expected to provide an in-depth epidemiological overview of the health impacts of ASGM. The methods, and tools developed to support it, were thus geared towards obtaining a preliminary and if possible representative picture of the health challenges of ASGM miners and their

communities and the health facilities' capacities to address and respond to their particular health needs.

Lessons learned and insights from the pilot experiences in Mozambique and two other countries (Ghana and Nigeria) will be used to enhance the protocol as well as present a set of tailored recommendations for each country which then can be used to inform the development of their public health strategies as part of the NAP. The objective of the health situation assessment is to identify ASGM miners' health seeking behaviour, miner and family members' perceptions of risks associated with ASGM as well as to assess the relative readiness and capacity of local health systems to respond to ASGM-related health issues.

Here, we present the findings of the health situation assessment performed in two ASGM sites in Mozambique.

Political linkages and political involvement in Mozambique

Mozambique has signed the Minamata Convention in 2013 (8). The country has also formally notified the Minamata Convention Secretariat that they have more than insignificant ASGM in their territories. The country is therefore obligated to develop a NAP which includes a public health strategy on the exposure to mercury of ASGM miners and their communities.

Under the Convention, such NAPs must be formally endorsed by the respective government and submitted to the Convention Secretariat no

later than three years after entry into force of the Convention or three years after the notification to the Secretariat, whichever is later. The Minamata Convention on Mercury will enter into force on 16 August 2017.

NAP activities are formally underway in Mozambique. This process is being supported by the United Nations Industrial Organization (UNIDO) with funding from the Global Environment Facility (GEF). At the request of UNIDO, WHO has agreed

BACKGROUND

to co-execute (with the respective health ministries) the health components of the NAP activities being implemented in each country.

UNIDO and the Mozambican Government have designated the Ministry of Mineral Resources and Energy (Ministério dos Recursos Minerais e Energia, MIREME, in the Portuguese acronym) to be the national executing agency of the NAP project. MIREME is the administrative authority for activities related to ASGM in Mozambique.

The Ministry for Land, Environment and Rural Development (Ministério da Terra, Ambiente e Desenvolvimento Rural, MITADER, in the Portuguese acronym), as the administrative authority on environmental protection in Mozambique, is responsible for the NAP activities covering

the establishment of the project coordination mechanism and the dissemination of information among stakeholders.

WHO, working in close coordination and collaboration with the Ministry of Health (MISAU), is the executing agency for the health components of the project.

UNIDO is the GEF Implementing Agency for the project. The UNIDO project manager will provide technical advice, as well as coordinate and monitor the project activities. All work plans, responsibilities, timelines, and budgets should be reviewed and approved by the UNIDO project manager to ensure fast, safe, and accurate execution of the project.

2 Aim and objectives



“ The health situation assessment is piloted in the three countries with the overall aim of informing the development, by relevant government agencies (i.e. health and other), of the public health component of the NAP.

”

Aim and objectives

ASGM sites and communities are diverse and often characterised as relatively remote with poor access to safe drinking water, adequate sanitation and health care (4).

While areas hosting ASGM are generally covered by the peripheral health system, accessibility, acceptability and affordability of health care in artisanal and small-scale gold miners, their families and the broader communities is very context specific.

The health situation assessment is conducted/ piloted in the three countries with the overall aim of informing the development, by relevant government agencies (i.e. health and other), of the public health component of the NAP. In this context, the present assessment sought to describe the scope of ASGM-related public health problems, characterize artisanal and small-scale gold miners' health seeking behaviours, miners and family members' perceptions of health risks associated with ASGM and to assess the capacity of the local health systems to cope with the challenges imposed by ASGM.

The specific lines of inquiry (and supporting hypotheses) of the health situation assessment were:

1. To describe the health issues as reported by artisanal and small-scale gold miners and by health care providers living and working in ASGM areas.
Hypothesis 1: There are differences between priority health concerns reported by artisanal and small-scale gold miners and the local (general) population as reported by health care providers and as reflected in local health statistics (where possible).

2. To describe health risk perceptions in artisanal and small-scale gold miners.
Hypothesis 2: Artisanal and small-scale gold miners' understanding and perceptions of the dangers of ASGM activities does not compel them to adopt safer or more environmentally friendly practices and/or pursue another activity.
3. To describe the access to health care, health-care seeking behaviour patterns and challenges related with it.
Hypothesis 3: Artisanal and small-scale gold miners, their families and the broader communities face challenges in accessing health care.
4. To describe the capacity and readiness of the health system and qualification of health care providers to address health problems specific to artisanal and small-scale gold miners, their families and the broader communities.
Hypothesis 4: The health care system, in particular at the local level (i.e. near to ASGM communities) is insufficiently capacitated to address health problems specific to artisanal and small-scale gold miners. Regional and local differences in capacity might also exist.

The results of the above objectives will further inform the awareness and health protection activities specifically tailored to local needs. It will inform the type of advocacy needed at different levels, the design and content of awareness-raising materials, the nature of potential outreach activities to be implemented and the involvement and responsibilities of different stakeholders.

3 Methodology



In this section:

Study design

8

Study sites

8

Study population and sample size

9

Community mobilisation and sensitisation activities

10

Data collection and tools

10

Data management

11

Ethical considerations

12

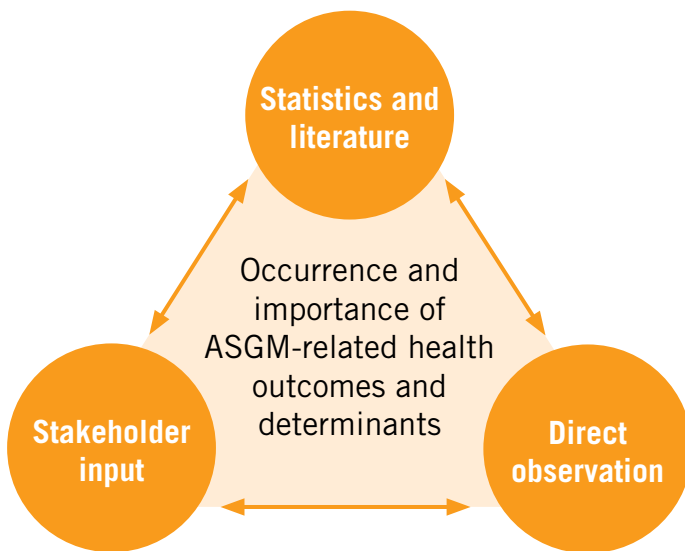
Methodology

Study design

This observational study applied a cross-sectional design using a mixed-method approach. To examine the interface between artisanal and small-scale gold miners and the health system, a combination of qualitative data from interviews and discussion rounds, quantitative data from the health sector (i.e. health statistics and health facility assessments

(HFA)) as well as direct observations (see Figure 1) were assembled (9). Such a methodological triangulation, combining multiple forms of evidence and perspectives, is an important means to enhance the validity of a recommendation and thus considered to be a robust methodology for use in the health situation assessment (10).

Figure 1: Methodological triangulation (adapted from Winkler et al. 2011)



Study sites

In Mozambique, two active ASGM sites were selected in Niassa and Manica provinces. These two sites were selected in line with the national ASGM baseline assessment studies being conducted in the country under the auspices of the Ministry of Mineral Resources and Energy. These sites were selected because they show ongoing mining

activities at current stage. In the selected sites, non-governmental organizations (NGO), community-based associations or civil society organizations were not present. Prior to this assessment, the ASGM communities in the selected sites were not well described. The final selection of sites is listed in Table 1.

Table 1: Sites investigated in the country

Province	District	Administrative post (state capital)	Locality	Mine	Obs.:
Niassa	Lago	Cobue	Lupilichi	Mpapa	Site 1
Manica	Manica	Machipanda	Maridza	Munhena	Site 2

Study population and sample size

In each ASGM area, key informant interviews (KIIs), focus group discussions (FGDs) and HFAs were conducted. The participant groups for the different data collection methods are shown in Table 2 below.

Furthermore, some statistics from the routine health information system were retrieved with a specific focus on health conditions related to ASGM issues.

Table 2: Target participant groups and target health facilities

Key informant interviews	Focus group discussions	Health facility assessments
<ul style="list-style-type: none"> ■ Local government officials ■ Local health authorities ■ Local environmental (health) authorities ■ Health care providers at peripheral health facilities in ASGM areas ■ Community leaders ■ ASGM community leaders 	<ul style="list-style-type: none"> ■ Artisanal and small-scale gold miners ■ Family members of miners ■ Community members in surrounding communities of ASGM sites (excluding leaders) 	<ul style="list-style-type: none"> ■ Nearest public, primary health care facilities serving ASGM communities ■ Referral hospital for the primary health care facilities

Participants of KII were identified among the participant groups and primarily targeted the highest authority in each group, i.e. District Medical Officer, District Environmental Health Officer, community leader, ASGM community leader (or their superiors) or health facility manager. Other relevant key informants were identified by the chain sampling method.

Participants for FGDs were recruited by the interviewers and the local partner on the ASGM sites and in the associated communities in arrangement with the local community and/or ASGM community leaders and the community health worker. Only individuals that have been in the area for two mining seasons or more were eligible to participate in FGDs in order to guarantee that participants have had a certain exposure time to the local circumstances. Care was taken to guarantee a random selection of participants in terms of type of work done (e.g. digging ore, washing ore, working

with mercury, etc.), the conditions (e.g. seasonal vs. annual workers) or demographic characteristics (e.g. age). FGDs comprised 5-10 participants allowing for a participative discussion lasting 45-90 minutes. Both gender-specific and mixed gender FGDs were conducted.

The public, primary health care facilities (health post and/or health centre) serving the ASGM community in each site were visited and subjected to a HFA. In addition, the first-level referral health facility for each primary health care facility was visited in order to include the facility where potentially more complicated cases would be handled (thus constituting an important link in the referral system for ASGM).

Written consent was obtained from all participants of KIIs and FGDs. Individuals less than 18 years of age were not included.

Community mobilisation and sensitisation activities

In the selected ASGM sites, community sensitisation activities were conducted prior to the site visits. A social mobilisation plan (SMP) was developed in advance with support of the Ministry of Health. The SMP described the process of: (i) informing the community about the piloting project and involving community leaders and others; (ii) explaining to the study population the necessity of doing the survey and its unfolding (duration and period of investigation, participant selection process and survey tools); (iii) sensitizing the communities of the ASGM sites to adhere to the study; (iv) creating a space for continuous exchange to engage with different community groups; and also described the (v) roles and responsibilities of different local

stakeholders as entry point for a participatory approach to engage with the community; (vi) how data were to be gathered and used, safeguarding full confidentiality; (vii) strategies for disseminating the findings of the project; and (viii) ensuring that the communities from the selected sites were duly informed and sensitised for study participation.

In order to carry out community mobilisation and sensitisation activities, the project team worked closely with local leaders and local health professionals as entry points for a participatory approach. No civil society organizations were engaged as none currently operate near the sites.

Data collection and tools

Document review

A review of available peer-reviewed literature produced on ASGM was carried out. The literature review informed the refinement of semi-structured questionnaires for conducting KII and FGD at the local level.

Key informant interviews

The interviews followed a semi-structured questionnaire specific to the different types of key informants consulted. The KII-questionnaires used are shown in the annex.

Focus group discussions

The discussions followed a semi-structured questionnaire tailored to the different type of participant groups targeted. The generic FGD-questionnaires are shown in the annex.

The same topics as for the KII were covered under the FGD using an open-ended questioning route.

The discussions were left open after a question was posed, encouraging active and spontaneous participation. The questionnaires were translated and administered in local languages. In the Niassa site, the majority of miners and community members spoke only Swahili due to the close proximity to the Tanzanian border and other historic development factors (the Mozambican civil war from 1977 to 1992 drove these border communities to Tanzania with many current working-age generations of Mozambicans having received primary education across the border) so the discussions were facilitated by a local translator. Whilst the researcher was steering the FGD, the local partner supported the translations.

Health facility assessment

At the level of health facilities, a HFA was conducted to assess the capacities and the readiness of the health system to provide health services. This covered human resources, availability and functionality of equipment and diagnostics and availability of medicines.

For this purpose, an adapted and abbreviated version of the WHO Service Availability and Readiness Assessment (SARA) tool was employed. Additional questions have been included on the basis of the WHO's technical paper on "Environmental and occupational health hazards in ASGM" to determine readiness to deal with common environmental and occupational health problems associated with ASGM, e.g. capacity to deal with poisonings (4). The HFA tool is included in the annex.

Direct observations

Direct observations were another important means of data collection during the field work activities.

While a comprehensive assessment of work processes, exposure pathways and other aspects of the ASGM-site was beyond the scope of this research, a rapid observational assessment was conducted. For this purpose, an observational "site walk-through" tool was used to describe ASGM working processes and conditions, access to drinking water and sanitation, use of personal protection measures, means of transportation, public health outreach activities at ASGM sites and other important characteristics of the site. The tool is included in the annex.

Data management

Data recording

Data from KIIs and FGDs were directly recorded in the questionnaire in the field either through (i) paper-based hand-written recording of answers or (ii) entering of answers and keywords directly into a computer. In the case of hand notes, answers were subsequently entered into a computer. KIIs and FGDs were not recorded on tape or transcribed.

Data protection and confidentiality

Computers were password protected and data stored on the server at Swiss TPH (encrypted with Secure Sockets Layer, to which only the study investigators had access). No individual data were given out to third parties. Names were obtained for the informed written consent and not to be associated with any of the data collected, including photographs. Names and signatures were not shared or used. No names are mentioned or appear in any documentation and dissemination of the research findings or photographs.

Data ownership and sharing

Data are the basis for all sound public health actions and the benefits of data sharing are widely recognized, including scientific and public health benefits. The data ownership policy is, as agreed in

the protocol, based on WHO's interests aligned and in accordance with Mozambican national interests, which are outlined in the data-sharing agreement (see annex). In this connection, and without prejudice to information sharing pursuant to the International Health Regulations and other legally binding instruments (e.g. the WHO Nomenclature Regulations 1967), by providing data to WHO, the Ministry of Health will sign an agreement that the country:

- Had confirmed that all data to be supplied to WHO hereunder have been collected in accordance with applicable national laws, including data protection laws aimed at protecting the confidentiality of identifiable persons;
- Had agreed that WHO shall be entitled, subject always to measures to ensure the ethical and secure use of the data, and subject always to an appropriate acknowledgement of [country]:
 - to publish the data, stripped of any personal identifiers (such data without personal identifiers being hereinafter referred to as "the Data") and make the data available to any interested party on request (to the extent they have not, or not yet, been published by WHO) on terms that allow non-commercial, not-for-profit use of the data for public health purposes (provided always that publication of the Data shall remain under the control of WHO);

- to use, compile, aggregate, evaluate and analyse the data and publish and disseminate the results thereof in conjunction with WHO's work and in accordance with the Organization's policies and practices."

As per contractual agreement between WHO and UNIDO "All intellectual property rights related to

the activities will belong to the recipient agency. The contributing agency and, if applicable, the relevant programme Government will enjoy a perpetual, royalty-free, non-exclusive and non-transferable licence." Hence, UNIDO is not the executing agency for the research and does not own the data.

Swiss TPH hands over all data to WHO at the end of the study.

Ethical considerations

Ethical conduct of study

The study was carried out in accordance to the present study protocol and with principles enunciated in the CIOMS International Guidelines for Health-Related Research Involving Humans together with the Declaration of Helsinki, as well as all national legal and regulatory requirements (11).

Participants were informed in detail about the planned research, as well as risks and benefits of participation, and informed consent of all study participants was obtained in writing (see annex). The information described the basic principles that guarantee the rights of participants in human research: voluntary participation; confidentiality and identity protection; benefits and risks; the amounts, methods, and timing of compensation; and the mechanism of communication of the results.

The consent form was administered by the study team before the application of the questionnaires. Participants had the opportunity to raise questions which were answered by the study team. Participants had the right to withdraw from the study at any moment without any consequences, in which case the already obtained information was deleted.

Ethical approval was sought across the Ethics Review Committee (ERC) of the WHO for the master study protocol. The study procedures and ethical considerations presented in the master protocol were followed in all three study countries. Thereafter, country-specific protocols were developed and ethical approval sought with the National Bioethics Committee for Health of Mozambique (Ref: 230/CNBS/19 of 17 May 2019).

4 Literature

review



“ Unfortunately, the mercury use and its effects on health were not of primary concern in this ASGM community, because they lacked basic access to health care and treatment of poverty driven diseases like malaria, AIDS and parasitic intestinal infections.

”

Literature review

The search terms “*artisanal gold mining AND Mozambique*” were entered into three databases: the Web of Science, PubMed and CINAHL.

From this search a total 16 papers were identified on these platforms. After screening the titles and removing duplicates, five publications concerning artisanal mining, health and Mozambique could be identified. Of these only two remained after abstract and full text screening and checking for accessibility of the papers. One of these, Drace et al. 2012, is very questionable and argues in a questionable manner to promote a mining institution (12). Therefore, only one paper is summarized here.

Shandro, Veiga and Chouinard evaluated an intervention on mercury use and retort introduction in a Mozambican ASGM site. During this intervention in 2005, mercury levels in exhaled breath from miners were on average 8.23 $\mu\text{g Hg/m}^3$, whereas a miner involved in amalgam burning even had a level of 50.0 $\mu\text{g Hg/m}^3$. Control levels from people

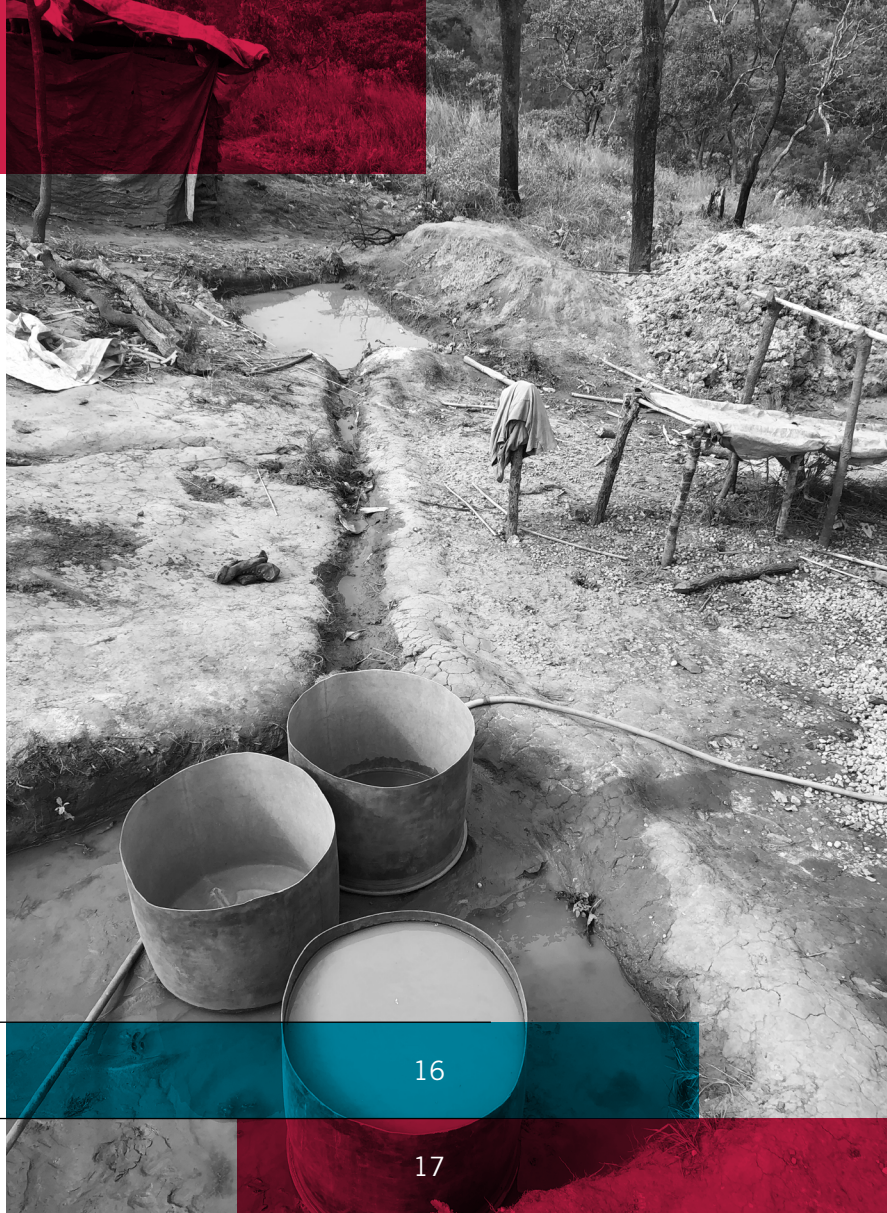
outside the community varied between 0.01 and 0.03 $\mu\text{g Hg/m}^3$. Ambient air at amalgam burning sites contained 30.0 $\mu\text{g Hg/m}^3$. This value lies between the different definitions of safe occupational mercury exposure at 25 $\mu\text{g Hg/m}^3$ and 50 $\mu\text{g Hg/m}^3$ defined by WHO and the American National Institute for Occupational Safety and Health, respectively.

During the evaluation in 2007, the authors found that the mining community only used one recommended site for amalgam burning instead of many as in previous years. Using a retort was a common practice, but the retorts were not used correctly. The retort was opened before cooling down and sand containing mercury residues was discarded. The ore transport still posed an additional health hazard, being the cause of many injuries.

Unfortunately, the mercury use and its effects on health were not of primary concern in this ASGM community, because they lacked basic access to health care and treatment of poverty driven diseases like malaria, AIDS and parasitic intestinal infections. A growing number of sex workers added to the risk of a higher incidence in sexually transmitted diseases (13).

5 Field study

findings



In this section:

Study population	16
Community profiling	17
Environmental and socio-economic impacts of ASGM activities	27
Health-related issues in the ASGM context	30
Health system capacities and readiness	36
Institutional and stakeholder aspects	48

Field study findings

Study population

A total of 17 KIIs, 15 FGDs and 4 HFAs were conducted (Table 3) in the two ASGM sites in Niassa and Manica provinces of Mozambique.

Table 3: Sample sizes

	Province		Total
	Niassa	Manica	
Key informant interviews			
Government officials	1	1	2
Health authorities	1	1	2
Environmental health authorities	1	1	2
Health care providers	4	3	7
Community leaders	0 ⁽¹⁾	2	2
ASGM community leaders	1	1	2
Civil society organizations	0 ⁽²⁾	0 ⁽²⁾	0
Total KIIs	8	9	17
Focus group discussions			
Miners	5	2	7
ASGM community members (non-miners)	2	2	4
Mixed miners and non-miners	2	2	4
Total FGDs	9	6	15
Health facility assessments	2	2	4

⁽¹⁾ The community leader in the Niassa site was also the ASGM community leader, hence it is not being double counted in this table.

⁽²⁾ There were no civil society organizations operating in any of the two ASG mining sites.

Lessons learnt with regards to the sampling:

- Flexibility is needed in the acceptance of KIs as some individuals need to be interviewed due to cultural norms and as a sign of paying respect.
- Interesting KIs might be outside the pre-defined KI categories.
- The 'health authority' from the first level, i.e. district, should be selected for a KII.
- For FGDs, two sub-categories are ideally defined: miners and non-miners. It was challenging to identify non-mining family members.
- Five to 10 days are required for one person to do all the required KIIs, FGDs and HFAs in one site. The tasks can be divided between skilled and trained investigators.

Community profiling

ASGM sites

The first site visited – the Mpapa mines – is located in Niassa province, in the Lupilichi locality (administrative post of Cobué, district of Lago). The second site – the Munhena mine – is located in Manica province, in the Maridza locality (administrative post of Machipanda, district of Manica). An approximate location of the ASGM sites is shown in Figure 2. The mining communities are described in more detail in the following sections. Table 4 describes the key features of each ASGM site and Figure 3 to Figure 17 depict ASGM conditions observed.

Figure 2: Approximate location of ASGM sites



Mpapa mines and communities

The Mpapa ASGM mining communities are located in a very remote area of Mozambique. Niassa is the northwesternmost province of Mozambique, about 1,200 km from Maputo. The district of Lago is yet the northwesternmost district of Niassa, and the Mpapa mines are located in the north of the district, a few kilometres from the Tanzanian border. The district of Lago has Lake Niassa to the west, which borders the Republic of Malawi. It takes around 10 hours to make the approximately 200 km by land between Lichinga, the provincial capital and Lupilichi, and another 2 hours to drive between Lupilichi and the Mpapa mining communities.

ASGM has been taking place in the district for many decades. The current ASGM community leader moved to the area in 1992 but ASGM was already taking place “many years” before his arrival, mainly by Tanzanian nationals and in a more disorderly manner than today.

In the Mpapa mining area, there are currently two mining associations with nine and six members (holders of government mining tickets), respectively, and about 80 collaborators, i.e. miners. All miners are male, the majority are Mozambican, mostly from the local area and a considerable proportion of Tanzanians is also present. Collaborators only perform specific tasks and are paid a salary per task or day (for example, carriers of ore bags are paid 100 Meticals per bag that they carry between the mine pit and the processing site and wood pickers are paid per load). Holders of mining tickets get revenue from the sale of gold that is produced.

FIELD STUDY FINDINGS

In the Mpapa mining area, ASGM is scattered across a relatively large area as there are currently 14 ASGM communities (“camps”) scattered across the area. While the majority of gold mining operations in the Mpapa mines area are considered artisanal, in

recent years ASGM community leaders have invested in more specialized (and no longer small scale) gold extraction processes and are now seeking to become a concession area, which would enable them to use mechanized means of ore extraction.

Figure 3: Mpapa village settlement seen from an ASGM mining site



Figure 4: Mining pit and gold processing site in one ASGM site

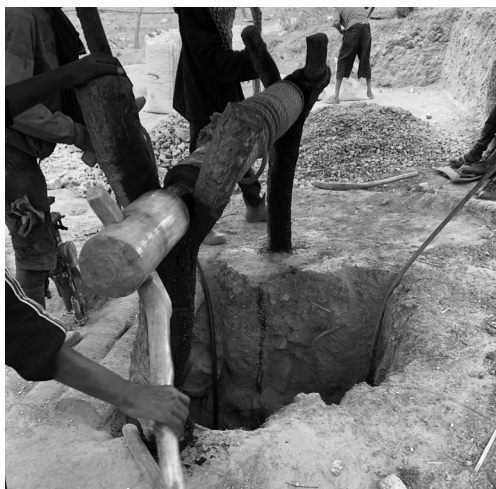


Figure 5: Cyanidation facility in one ASGM area



Munhena mine and community

The Munhena mining community is located in Manica province, Manica district at Machipanda administrative post. The province of Manica is located in the central region of Mozambique, its capital city is Chimoio, which is about 700 km north of Maputo. Manica province has a northern boundary with the province of Tete, an eastern boundary with the province of Sofala and southern borders with the provinces of Inhambane and Gaza. To the west, Manica is bordered by Zimbabwe. In turn, the district of Manica, where the Munhena community is located, has a northern boundary with Barué district, a western boundary with Zimbabwe, a southern boundary with Sussundenga district and an eastern boundary with Vanduzi district.

In this district, ASGM has been occurring for many decades and in the Munhena community since 1999. ASGM in Munhena was initially practiced only by Mozambicans. Current leaders of the Munhena mining community are native to Manica district.

In the Munhena mining area, there is currently one mining organization composed of 80 members of both genders (mostly male) of which 10 members are members of the board of the organization and all are of Mozambican nationality. Members who carry out their activities at the mine sell the processed gold and from the proceeds they take a portion to the mining society of Munhena for payment of taxes. For example, if a miner produces and sells 3 grams of gold, after the sale he takes 6% of the revenue to the mining society.

The Munhena mining community currently has 1 mine and 1 camp. This artisanal mining activity at the Munhena mine still uses unspecialized means and processes and is currently in the process of re-organizing itself into a mining society with a vision to use more specialized means for gold mining and processing.

Figure 6: Mining pit at Munhena ASGM site



Women and child miners

The engagement of women and children in ASGM and ASGM-related activities is well documented in the literature and has been observed in other countries that are part of this study (for example, in the mining sites visited in Nigeria). However, in the two Mozambican sites visited, no women or children were observed to be engaged in any ASGM activity. When enquired specifically about women's involvement the responses were consistent across KII and FGD: women are not allowed to be engaged in any ASGM activity because during menstruation they are perceived to be "unclean". The male respondents stated that given that it is difficult to control at what times women are menstruating, they are banned from engaging in ASGM activities. This can be interpreted as a gender norms and taboos discriminating against women at ASGM sites and has been documented elsewhere in the literature (14). While no children were observed to be engaged in ASGM or ASGM-related activities in either site, some respondents mentioned that some children/young people had dropped out of school to engage in ASGM and ASGM-related activities (see Table 6), indicating that some children may indeed be engaged in ASGM activities.

Other vulnerable and marginalized groups

Elderly people, both men and women, were considered a vulnerable group by most KIIs. They were perceived as vulnerable because they cannot engage in revenue-generating or subsistence activities, often have more difficulty in accessing (affording) health care and satisfying other needs (e.g. food) and need to rely on their children or the wider community for support.

Non-locals (or in-migrants), both from elsewhere in Mozambique or from other countries, were not seen as marginalized. Indeed, given the historical context that surrounds these communities, specifically the forced migration of entire Mozambican communities into Tanzania to flee the civil war and their subsequent later return has created strong ties across borders and considerable inclusion of migrants in the visited communities. Furthermore, the remoteness of the areas, especially in Niassa and the proximity of more (and more diverse and developed) goods and services available in Tanzania, make cross-border movements very frequent and further contribute to the social inclusion of migrants into mainstream society without discrimination.

FIELD STUDY FINDINGS

In the visited communities, miners in general were not considered a neglected group (in comparison to other groups in the communities). However, it can be argued that these mining communities are, themselves, neglected (in general terms, for example in terms of access to key social services including health care services) due to their remoteness and not to their primary economic activity being ASGM. In fact, these communities (especially in Niassa) have benefitted from additional security

services (police resources and military presence in the district) following a recognition by the central government of the importance of ASGM to the national economy.

Children under the age of 5 years and young people were also considered as vulnerable groups by some KII due to biological factors and risks linked to environmental exposures.

Table 4: Key observational features of the selected ASGM sites

Province	Niassa	Manica
ASGM site name	Mpapa	Munhena, Maridza, Manica
Approximate size / surface	The Mpapa mines are scattered across a relatively large area (about 100 km ²) with multiple ongoing mining sites. The mountain mining site that was visited had about 25 miners currently working. At the leachate cyanidation facility only 1 person (guard) was present as there wasn't any processing being done at the time of the visit.	The Munhena mine is a concise ASGM mining location with about 120 people working at any one moment.
Years of ASGM activity	Many decades (30+ years)	Many decades (30+ years)
Types of gold mining	Although only one rock mining site (underground mines) was visited, in the mining concession area there were several alluvial mining sites.	Rock
Nature of gold mining	<p>The underground mining site visited:</p> <ul style="list-style-type: none"> ■ can be classified as small scale (however, there are several sites of the same size and nature distributed throughout the concession area) ■ is rudimentary, using only some equipment (underground mine water pump, interior mine air pump, diesel generated mechanical grinding, pneumatic pickaxe to assist the excavation process inside the mine) <p>The leachate cyanidation site can be classified as medium-sized, containing five tanks of 3,000 L capacity (each) for the processing of leachate subsequent to the mercury amalgamation process (Figure 5). Although it cannot be considered an industrial process, the development of this cyanide leaching site required “a large initial and ongoing monetary investment” as well as initial and ongoing technical support by a Tanzanian graduate/postgraduate chemical or mining engineer with experience in gold mining. This consultant frequently travels from Dar es Salaam to this cyanide leaching site. The interviewee could not explain in detail the various chemical processes involved in this leaching process. There are two cyanide leaching processing sites in this ASGM area.</p> <p>The cyanidation site receives the material for processing via heavy trucks (large vehicles); at the time of the site visit, the vehicles were damaged and awaiting the arrival of repair parts, so the cyanide leaching site was not operational.</p>	Equipment use (crushers)
Seasonal nature	Annual	Annual

Province	Niassa	Manica
ASGM site name	Mpapa	Munhena, Maridza, Manica
Organizational structure	<p>Organized</p> <p>There are four mining associations operating in the area. Some of the workers operating in the area are mining ticket holders. Others are merited members (or ‘collaborators’) who are salaried and paid according to the amount of work they do (e.g. the amount of ore bags they carry from the underground mine zone to the ore processing zone).</p> <p>There is local ambition to turn associations into cooperatives. A cooperative can, under the law, make use of heavier machinery to assist the mining process. The interviewee was confident that cooperative status can be achieved during the next year (2020).</p>	<p>Organized</p> <p>Part of a mining association</p>
ASGM worker demographics	All males	120 workers; all males
	No children were observed working	No children were observed working
	According to local culture and tradition, women are prohibited from participating in mining activities	No women are currently working in the mines
Information on migration patterns	<p>It was reported that most of the workers have Mozambican nationality and are from the Niassa province. Some are from other districts of the Niassa Province or other provinces. Some have Tanzanian nationality. It is important, however, to bear in mind that the civil war (1977-1992) forced a migration of Mozambicans residing in this area to neighbouring Tanzania, where they have been educated and returned to Mozambique after the ceasefire. For this reason, most Mozambican artisanal miners speak Swahili and do not speak Portuguese.</p>	<p>Regional migration from Manica and Sussudenga; main origin of migrants is Zimbabwe.</p>
Activities observed	<p>Underground mine site processes</p> <p>Prospecting of productive sites is done with the help of specialized professionals (people with undergraduate or postgraduate degrees in the relevant area, e.g. geology) who do soil sampling and analysis.</p> <p>When a potentially productive site is identified, miners begin digging underground mines, which are mined until they are no longer productive, which can happen over several months. The initial substrate layer is excavated until it reaches the parent or primary rock layer, which contains the gold ore.</p> <p>The entry and exit of underground mines are made aided by a rudimentary (wooden) pulley and rope system lubricated with oil. The miner is lifted by sitting on a small stick tied to the end of the rope. The pulley is driven by two people. Underground mine walls are stabilized with sticks to prevent landslides. Underground mines can be up to 30 meters deep (when vertical). From the bottom of the underground mine exit horizontal galleries that can be tens of meters long.</p> <p>When underground mines are filled with water (infiltration from aquifers), a diesel pump is used to remove this water. A diesel pump is also used to introduce ambient air from the surface to the interior of the mine.</p> <p>Communication between the bottom of the mine and the outside is via a pipe that allows a miner at the bottom of the mine to talk to an individual who is “listening” whenever a miner is inside the underground mine.</p> <p>Miners can take shifts of up to 6 to 8 hours inside underground mines.</p> <p>Digging inside the mine can be done with the aid of hand picks or small pneumatic picks. The excavated material (rock) is removed by the same pulley and rope system.</p>	<p>Mining with stone extraction takes place on the mountain (above the mountain) and processing, including grinding and washing, takes place on the mountain foothills.</p> <ul style="list-style-type: none"> ■ Extraction ■ Stroking ■ Outdoor mercury burning ■ Tunnels ■ Grinding ■ Gravitational concentration

FIELD STUDY FINDINGS

Province	Niassa	Manica
ASGM site name	Mpapa	Munhena, Maridza, Manica
	<p>At the surface, the excavated material (rock) is broken into smaller rocks with the aid of hammers and hand picks and placed in bags of 30 to 40 kg. These bags are carried manually (on the backs of employees) to a processing site about 30 meters distant from the underground mines. Here, the rocks are heated/burned in the open (using wood or charcoal as fuel) in a tray, then placed in a grinding cylinder, powered by a diesel engine, and transformed into very fine material (dust or “sand”).</p> <p>This fine material is washed through a rudimentary scrubbing system for gravity concentration and the gold-containing material is captured in a mesh/crosslinked material (gold concentrate and other heavy particles). This net is then washed in a basin with water so that the gold/concentrate material is in the basin. In this basin mercury is applied to create the amalgam. The amalgam is then burned in a metal cup in the open at the same location.</p> <p>Waste from this amalgamation process (mercury tailings) is reserved for later transport to the cyanide leaching site (truck transport). The packaging of mercury tailings is done in open drums inside a rudimentary and unsecured containment/catch basin (without waterproofing, risking drainage to soil) with escape flows into a second rudimentary and unsecured retention/catch basin (without waterproofing, risking drainage to soil) (Figure 12).</p> <p>Processes at the cyanide leaching site</p> <p>A (now defective) lorry transports the waste from the mercury gold extraction process to this location. Here are five tanks of 3,000 L capacity each, where the mercury tailings are deposited. The interviewee could not explain in detail the chemical processes involved in this cyanide leaching process.</p> <p>The mercury used in the concession area comes from China and the cyanide used comes from India but “it is not always easy to buy”.</p> <p>Activities observed</p> <ul style="list-style-type: none"> ■ Extraction ■ Stroking ■ Outdoor mercury burning ■ Tunnels ■ Grinding ■ Gravitational concentration ■ Concentrated amalgamation 	
<p>Physical hazards observed</p>	<ul style="list-style-type: none"> ■ Stroking ■ Noisy instruments ■ Ore processing ■ Underground mines ■ Confined spaces ■ Contact with live wires ■ Contact with malfunctioning electrical equipment ■ Dust ■ Air pollution (fuel combustion) ■ Exposure to sunlight (UV) ■ Vibration (although it was not directly observed, one miner entered the mine with a pneumatic hammer/pickaxe) 	<ul style="list-style-type: none"> ■ Stroking ■ Noisy instruments ■ Cuts ■ Ore processing ■ Underground mines ■ Confined spaces ■ Contact with live wires ■ Dust ■ Air pollution (fuel combustion) ■ Exposure to sunlight (UV)

Province	Niassa	Manica
ASGM site name	Mpapa	Munhena, Maridza, Manica
Mechanical hazards observed	<ul style="list-style-type: none"> ■ Lifting loads ■ Incorrect postures ■ Work using non-mechanized materials ■ Repetitive work ■ Improper use of equipment 	<ul style="list-style-type: none"> ■ Lifting loads ■ Incorrect postures ■ Work using non-mechanized materials ■ Repetitive work ■ Improper use of equipment ■ Use of heavy equipment
Chemical hazards observed	<ul style="list-style-type: none"> ■ Elemental mercury ■ Carbon monoxide ■ Cyanide 	<ul style="list-style-type: none"> ■ Elemental mercury ■ Carbon monoxide
Biological hazards observed	<ul style="list-style-type: none"> ■ Stagnant waters ■ No vectors were observed, probably because it was the period of the year with the lowest mosquito activity 	<ul style="list-style-type: none"> ■ Stagnant waters ■ No changing room at the extraction site (workers urinate and defecate outdoors)
Psychosocial hazards observed	<ul style="list-style-type: none"> ■ Unsafe working conditions ■ Poor living and working conditions 	<ul style="list-style-type: none"> ■ Unsafe working conditions ■ Poor living and working conditions
Protective measures observed	<ul style="list-style-type: none"> ■ Boots (although not very robust/protective) 	

Lessons learnt with regards to the observational tool:

- The observational tool was useful in getting a fast overview of the site. The more options

that are displayed (e.g. for vectors), the better because it is easier to fill in.

- The observational tool was usually filled in with the support of the ASGM leader or a worker who could provide accurate information on the site.

Figure 7: ASGM mountain site with various active mining pits being explored (extraction of hard rock-deposits)



Figure 8: Alluvial ASGM site (inactive)

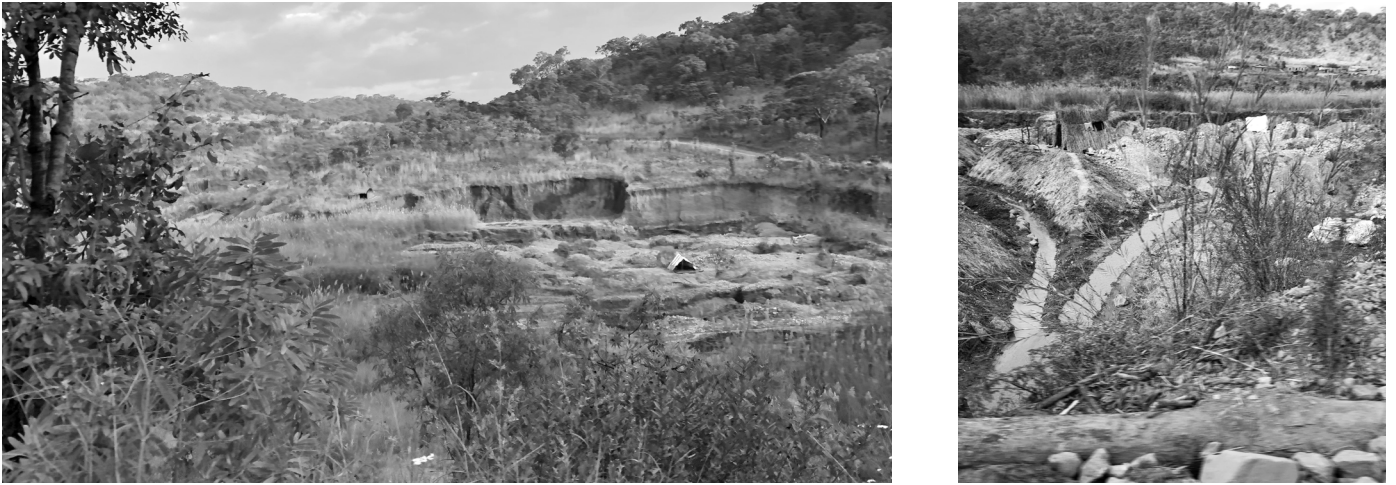


Figure 9: ASGM site where processing, concentration, amalgamation and burning take place (left) and heating crushed ore before milling (right)



Figure 10: Mill for crushing ore into fine powder



Figure 11: Tools for gold concentration and retention in mesh-net



Figure 12: Mercury contaminated tailings in unsafe retention ponds being collected for transportation to cyanide leaching site



Figure 13: Temporary living arrangements in ASGM mountain site



FIELD STUDY FINDINGS

Figure 14: Mining pit with unsecured walls



Figure 15: Mining pit with secured walls



Figure 16: ASG miners lifting and carrying heavy loads (about 40 kg) from mining pit to processing site



Figure 17: Cup where amalgam is placed and heated to vaporize the mercury (open burning)



Environmental and socio-economic impacts of ASGM activities

Environmental impacts

Awareness of environmental impacts of ASGM varied across KII respondents. While a few were able to describe the pathways that link ASGM activities with environmental impacts, most had no appreciation of

the environmental risks and impacts or could only partially describe them. Table 5 summarizes the environmental impacts perceived by KIIs, structured in leading themes and specific issues mentioned therein.

Table 5: Environmental impacts according to key informants

Leading themes	Specific issues
Environmental degradation	<ul style="list-style-type: none"> ■ Deforestation (to collect solid fuels) ■ Soil erosion from alluvial mining and soil contamination with chemicals ■ Soil degradation with implications to quality and productivity of crops ■ Field burns that kill animal species and flora destruction ■ Mountain destruction which in turn affects the soil
Use of mercury	<ul style="list-style-type: none"> ■ Water becomes contaminated by mercury ■ Fish get contaminated by mercury
Contamination of soil	<ul style="list-style-type: none"> ■ Burning mercury contaminates the soil through the rain, contaminating crops (i.e. corn) that when eaten can expose people to mercury
Contamination of water	<ul style="list-style-type: none"> ■ River water contamination in the vicinity of the mines ■ Mercury in water is taken up by fish that are eaten by people, exposing them to mercury ■ Less fish available due to poor water quality ■ Alluvial mining makes the river waters less clean (turbidity) ■ Water contaminated by chemical products ■ Siltation of rivers ■ Animals have less access to uncontaminated water sources ■ Fish and other animals drinking from contaminated waters die or become ill ■ Turbidity of the river waters due to clay
Contamination of air	<ul style="list-style-type: none"> ■ Burning mercury contaminates the air, exposing individuals near burning sites

Figure 18: Logging and deforestation for the collection of solid fuel for ASGM use



Figure 19: Land degradation in abandoned alluvial mining location



Socio-economic impacts

A range of positive, negative, direct and indirect socio-economic impacts were mentioned as consequences of ASGM and related activities. Table 6 summarizes the leading themes and specific socio-economic impacts described by KIs.

Positive socio-economic impacts described by KIs included contributions to general socio-economic development of communities, improved local economy, increased employment opportunities and income, decreased dependence on subsistence farming, improved livelihoods (linked to more income and better access to commercial and public goods and services), improved access to drinking water services, improved mobility and transportation infrastructure, improved social infrastructure

(education and health facilities), and improved housing conditions.

Negative socio-economic impacts described by KIs included insecure employment, decreased productivity from subsistence agriculture, loss of revenue from undeclared mineral products, increase in alcohol consumption, increase in commercial sex services, increase in child marriages, and unequal distribution of ASGM-related economic benefits which promotes inequality.

Some socio-economic impacts were described as mixed, being positive and negative depending on the community and perspective of the respondent. These included impacts on education, security and conflict and in-migration.

Table 6: Socio-economic impacts according to key informants

Leading themes	Specific issues
Economic impacts	<ul style="list-style-type: none"> ■ General increase in income in ASGM areas ■ Increased income of ASGM miners ■ Increased income of ASGM households (families) ■ ASGM is an inconsistent (insecure) source of income for most miners and has been decreasing over time ■ Enhanced local economic activity from increase in trade, commerce, other economic activities, in ASGM areas ■ Increase in other economic activities such as cattle shepherding, agricultural production and small-scale commerce that revolve around the ASGM population ■ Increase in employment opportunities ■ Decreased revenue from crops (due to environmental degradation) ■ Loss of revenue to government from undeclared mining products and unpaid mining taxes/royalties/fees
Livelihoods	<ul style="list-style-type: none"> ■ Decreased soil/crop productivity of subsistence agriculture locations due to ASGM-related environmental degradation (soil, water, crop contamination) ■ Mining, mining related activities and mining-supporting services are the main source of income for communities enabling the acquisition of necessities and meeting the requirements of households ■ ASGM activities generate/fuel a local economy – disposable income generates demand that is supplied by services that are set up to satisfy this demand – creating alternative sources of livelihoods to subsistence farming (shops, private dispensaries, restaurants, etc.) ■ Improved access to water (decreased time spent collecting water), e.g. in Niassa site a piped water supply system from mountain springs to villages was financed by a mining association
Education and school enrolment	<ul style="list-style-type: none"> ■ Income from ASGM enables parents to send/enrol their children to school ■ Some children/young people drop out of school to engage in ASGM and ASGM-related activities ■ Construction of community schools (primary and secondary) with revenue from ASGM activity (e.g. Nhamachato Elementary and Secondary schools)
Security and conflict	<ul style="list-style-type: none"> ■ Construction of a police station and staffing with a police officer to ensure civil order ■ Social status of miners has been decreasing while mining companies become larger and more profitable
Institutionalisation (organization, skills)	<ul style="list-style-type: none"> ■ Construction of a police station and on-site police detachment due to mining activity ■ Construction of a government house and a political party house
Social issues including crime, drugs, alcohol and prostitution	<ul style="list-style-type: none"> ■ ASGM activities directly increase disposable income in a predominantly male population (some being migrants away from families), i.e. mobile men with money, which increases the demand and promotes the emergence of entertainment services (used mostly in late afternoons and evenings, i.e. after work) that are linked to the consumption of alcohol and to demand for commercial sex services ■ Miners often consume more alcoholic beverages, usually in the late afternoon, when the malaria mosquito is most active ■ Increase in child marriages in the ASGM communities

Leading themes	Specific issues
Non-locals, in-migrants	<ul style="list-style-type: none"> General in-migration to ASGM communities (mostly men seeking employment in ASGM and related/supporting activities) Both internal migration (from elsewhere in Mozambique) and from other countries (i.e. from Tanzania and Zimbabwe) Specific in-migration of women, mostly from other countries to provide commercial sex services to miners
Inequalities	<ul style="list-style-type: none"> Not everyone benefits from the economic activity and income generated by ASGM Most wealth generation tends to be concentrated in the hands of a few people
Social cohesion	<ul style="list-style-type: none"> Good social cohesion within ASGM mining communities (Niassa site) Reduced social cohesion in the communities where mining is practiced, especially between miners (Manica site) Construction of a church with funds from mining activity
Living conditions	<ul style="list-style-type: none"> ASGM has promoted general socio-economic development of the communities (Niassa site) ASGM has not translated into general socio-economic development of the communities (Manica site) Improved mobility from some improvement in transportation infrastructure and ongoing maintenance (roads) linking ASGM sites to larger settlements (also decreases travel time/ improves access to other goods and services such as health care) Improvement of social infrastructure, e.g. construction of a maternity ward in the Lupilichi health centre
Housing	<ul style="list-style-type: none"> Community members are using ASGM-related income to build houses, refurbish/improve existing houses
Access to commercial goods and services	<ul style="list-style-type: none"> Improved access to commercial goods and services – increased disposable income led to increase in local businesses catering to mining population, including shops, private dispensaries, restaurants, etc.

Health-related issues in the ASGM context

General health situation

Table 7 summarizes the general health issues affecting the ASGM communities that were mentioned by KIs for different population groups.

Frequent health issues as reported by participants from the FGDs varied among the different population groups (Table 8).

Table 7: Health issues according to key informants

Population group	Common health issues
All ages	<ul style="list-style-type: none"> ■ Malaria ■ Respiratory problems (chronic pulmonary obstructive disease) ■ Diarrheal diseases ■ Excess drinking ■ Sexually transmitted infections (STIs) ■ Few hygiene practices ■ Occupational hazards and accidents ■ Tuberculosis ■ Malnutrition ■ Chronic cough ■ HIV/AIDS ■ Open wounds and fractures ■ Accidents due to falls in mining pits
Children	<ul style="list-style-type: none"> ■ Malaria ■ Very few hygiene practices ■ Diarrheal diseases ■ Coughing and respiratory diseases ■ Low adherence to vaccination campaigns

Table 8: Health issues according to focus group participants

Population group	Common health issues
Children	<ul style="list-style-type: none"> ■ Respiratory tract infections ■ Diarrheal diseases ■ Malaria ■ Asthma ■ Schistosomiasis ■ Skin diseases (water washed and hygiene-related) ■ Soil-transmitted helminth infections ■ Nutrition-related conditions (undernutrition and low weight)
Adults	<ul style="list-style-type: none"> ■ Malaria ■ Respiratory tract infections ■ Diarrhea ■ Sexually transmitted infections ■ HIV ■ Tuberculosis ■ Onchocerciasis (river blindness) ■ Lymphatic filariasis ■ Hypertension ■ Road traffic accidents and injuries ■ Skin diseases ■ Neuropsychiatric conditions (e.g. epilepsy)
Men	<ul style="list-style-type: none"> ■ Inguinal hernia disease ■ Impotence/sexual dysfunction
Women	<ul style="list-style-type: none"> ■ Childbirth conditions

FIELD STUDY FINDINGS

Health statistics retrieved from a community health worker working in one of the villages near one of the mining sites broadly support this general health profile. These statistics refer to 87 community members (49% male) aged 5 months to 71 years.

Among the 18 children under the age of 5 (21% of entries) that were observed by the community health worker, 2 were diagnosed with malaria (11%) confirmed through a rapid diagnostic test (RDT); 6 were diagnosed with diarrhea (33%) and 10 were diagnosed with an acute respiratory infection (55%).

Only four community members between the ages of 5 and 17 years were observed by the community health worker. Two were diagnosed with bacterial conjunctivitis, one with the flu and one with malaria (confirmed by RDT).

Among the 65 adults observed by the community health worker, 17 were diagnosed with malaria (26%), 9 were diagnosed with respiratory infections¹ (13%), 8 presented with the symptom “abdominal pain” (12%), 7 were diagnosed with diarrhea (11%), 6 (4 women and 2 men) were diagnosed with STIs (9%), and 3 presented with “injury” (5%). Other diagnoses/symptoms/causes registered among adults include “pregnant woman”, headache, neck pain and “general pain” and abscess.

Awareness of ASGM activities

KIs whose scope of work is directly related to mining activities or mining populations were well aware of ASGM activities that take place in both sites (mineral resources officials, health workers engaged in health promotion activities with mining populations, and community leaders). The awareness of other KIs (health care workers that provide curative services in local and district/regional health facilities) was more limited; while they knew that ASGM was taking place, they could not describe what types of mining were taking place nor could they describe the mining process in detail.

Awareness of mercury use

Awareness of mercury use in ASGM and understanding about mercury exposure pathways and environmental and human health consequences differed greatly between KIs and was generally limited. Very few KIs were able to specifically and

spontaneously mention mercury use as a key issue in ASGM and its associated environmental and health consequences (e.g. “water contamination” and “respiratory issues”) while a few others mentioned chemicals in general. The majority of KIs did not mention mercury or even chemicals in general as an environmental or health concern.

KIs who were aware of mercury use and its consequences were only able to partially describe the environmental pathways to exposure and subsequent health effects. Amongst FGD participants, awareness about environmental pathways to exposure and subsequent health effects was also varied and limited.

Awareness of ASGM health issues

Among key informants

From the KIs’ perspective, miners are often unaware of the health effects of ASGM, including mercury use. However, when miners are aware of health effects of ASGM this awareness tends to not translate into protective behaviour due to the difficulty in purchasing personal protective equipment (PPE), the unavailability of safer/cleaner technology, negligence in favour of the economic opportunity and other contextual limitations to safer ASGM practices. KIs believe that miners are ‘ignorant’ of the health risks related to ASGM. This ‘ignorance’ includes both the awareness of health risks and the willingness to protect oneself from risks even if aware.

As described in the previous section, local KIs also were not always aware of the harmfulness of mercury to health.

Among non-mining community members

Family members of miners generally do not believe they are exposed to any ASGM-related risk as they “do not drink water from rivers near ASGM sites” and ASGM activities take place “at some distance” from their homes. However, they believe ASGM to be a risky activity and that miners are exposed to considerable risks linked to unsafe working conditions but that the majority of miners do not protect themselves, for example through the use of PPE.

Other community members that are not family members of miners nor engaged in mining have a mixed awareness of ASGM health issues. Some of these community members stated that ASGM is as risky as any other activity, e.g. “all professions have their hazards, being a driver is also hazardous”,

¹ This includes acute respiratory infections, pneumonia and the flu.

and were unable to list any specific hazards or risks associated with ASGM, were unaware of mercury use in ASGM nor that it was hazardous to human health or the environment and were not able to say how miners safeguarded themselves against any ASGM-specific risk. Other community members did indeed perceive ASGM as a risky occupation and believed that the majority of miners do not practice ASGM in a safe manner. Furthermore, they stated unsafe behaviours occur because PPE is not available, PPE is expensive and miners cannot afford to buy it, or PPE is often not available in local stores.

Among miners

Miners believed ASGM is a risky activity. While rock mining is generally perceived as riskier, alluvial mining was also considered risky in relation to landslides. Most miners did not mention mercury exposure, or exposure to chemicals in general, as a health risk, and none reported knowledge of existing cases of mercury-related illness among miners or local community members. When specifically enquired whether mercury is a health hazard, some miners agreed that mercury could cause harm but downplayed the risk, revealing misconceptions or limited knowledge, as illustrated by the following quotes: “we do not think there is a danger [due to contact with chemicals such as mercury] as long as

we don't have cuts in our hands and we wash our hands after handling the mercury”; “we know there is a risk associated with burning [the amalgam] but its OK as long we are not too close”.

Among health care providers

Awareness of health risks in miners among health care providers was high for biomechanical risks (e.g. fractures, uncomfortable postures, injuries), and biological risks (e.g. unsafe sanitation, unsafe sexual behaviours), moderate for physical risks (e.g. heat, low oxygen levels) and low for chemical risks from mercury or cyanide. While most health care professionals were aware that mercury use in ASGM was a health hazard, very few were able to describe the various pathways leading to exposure. Misconceptions were also apparent, e.g. “the consequence of mercury exposure in the communities are the cases of cancer”.

Health risks and effects of ASGM

A myriad of health risks and effects of ASGM were described by KIs (Table 9). The feedback received reveals some misconceptions. For example, the reported link between exposure to mercury or methylmercury and cancer is not well supported by scientific evidence.

Table 9: Health risks and effects of ASGM according to key informants

Leading themes	Specific issues
Occupational hazards	<ul style="list-style-type: none"> ■ Accidents with open wounds and fractures ■ Accidents and injuries from fall in pits ■ Dust and air contaminants inhalation ■ Collapsing pits ■ Land slides ■ Falling stones ■ Exhaustion
Environmental health hazards	<ul style="list-style-type: none"> ■ Drinking contaminated water ■ Malnutrition due to less agricultural practice and food availability ■ Exposure to mineral dust and compounds
Vector-related hazards, animals	<ul style="list-style-type: none"> ■ Exposure to mosquito bites ■ Malaria ■ Insecticide treated bednets (ITNs) not available for miners that sleep near the mines (ITN distribution campaigns only provide for main household not for a secondary sleeping location)
Chemical hazards	<ul style="list-style-type: none"> ■ Poisoning from mercury inhalation, direct contact or consumption in food

FIELD STUDY FINDINGS

Leading themes	Specific issues
Social and livelihood hazards	<ul style="list-style-type: none"> ■ Increase in STIs ■ Difficult access to health care services (distance) ■ Food shortages
Community exposures	<ul style="list-style-type: none"> ■ Respiratory diseases due to dust ■ Accidents and injuries from fall in pits
Health effects	<ul style="list-style-type: none"> ■ Malaria ■ Diarrheal diseases ■ Conjunctivitis ■ Liver disease due to alcohol consumption ■ Neurological diseases due to alcohol abuse ■ Syphilis ■ HIV/AIDS ■ Traumatic lesions ■ Chronic obstructive pulmonary disease ■ Abdominal cramps ■ Tuberculosis ■ Hypertension ■ Inguinal hernia ■ Gonorrhoea ■ Accidents and injuries ■ Neoplastic diseases (cancer) ■ Open wounds and fractures

Health risks and health effects described by FGD participants are shown in Table 10.

Table 10: Health risks and effects according to focus group participants

Leading themes	Specific issues
Occupational hazards	<ul style="list-style-type: none"> ■ Ergonomic and biomechanical hazards (carrying heavy loads) ■ Mechanical vibration and shock (hand-arm vibration) ■ Landslides and rock slides, traumatic falls potentially leading to death ■ Exposure to high concentration of dust (Total Suspended Particles) ■ Carbon monoxide intoxication
Vector-related hazards, animals	<ul style="list-style-type: none"> ■ Insect bites in general ■ Exposure to mosquito bites and malaria
Chemical hazards	<ul style="list-style-type: none"> ■ Inhalation of mercury while burning amalgam
Social and livelihood hazards	<ul style="list-style-type: none"> ■ Prostitution ■ Alcohol consumption
Health effects	<ul style="list-style-type: none"> ■ Physical injuries (crushing; lesions to eyes, hands, limbs) ■ STIs including HIV ■ Respiratory conditions, including infections, asthma, tuberculosis ■ Musculoskeletal conditions (e.g. lower back pain)

Use of protective measures

All KIs reported that the use of PPE is very low or not existent. Very few miners use gloves, steel boots, masks or protective glasses. KIs also noted a lack of willingness to adhere to safety precautions and procurement of PPE as well as limited affordability and availability of this type of equipment.

Miners reported that they mostly work without wearing any PPE. Miners mostly work barefoot or with sandals (flip flops), few with basic sneakers and some with boots (although not steel boots). Even though hands get stiff and skin diseases are frequent, gloves were not used.

Some miners admit that PPE would be good, but they concede that it will be inconvenient to work with PPE. For example, the heat would not allow them to wear protective clothing.

Health seeking behaviour

Miners often attempt self-medication and home-made treatments or seek the private dispensary for small ailments and injuries. The next point of contact tends to be community health workers, again for first aid and small injuries. If the health conditions are not resolved, miners stated various responses, including not seeking any further care or seeking care across the border (for example, in the Niassa site, care was often sought in Tanzania where better facilities staffed by medical doctors are available at close distance). Miners do not go to the Lupilichi health centre as this has no specialized diagnostic equipment, does not have a medical doctor and often lacks medicines. Some miners prefer to use traditional medicine. In the Manica site, ASGM was practiced in close proximity to local health centre and a referral hospital. Both were often used by miners.

Table 11: Health seeking behaviour of miners according to key informants

Leading themes	Specific issues
Modern medicine versus traditional medicine or self-medication	<ul style="list-style-type: none"> ■ Miners do not seek health care services as often as they should ■ Some miners prefer to seek traditional medicine practitioners ■ Modern medicine is mainly sought in cases of flu, back pain, malaria, abdominal cramps and diarrheal diseases ■ For serious accidents and injuries (fractures), STIs, tuberculosis and hypertension, Tanzanian health care services are the first option ■ As awareness about health problems increases within mining communities, people increasingly prefer to go to the hospital to receive treatment
Access to health care	<ul style="list-style-type: none"> ■ Willingness to access health care is limited ■ Improved access to health care services in Tanzania (either by Tanzanian migrant workers or because Tanzanian health care facilities are closer to mining camp sites) ■ Distance is the main reason for not seeking health care services ■ Referral health care units for serious injuries should be Lupilichi or Wiki but there is very limited to non-existent response capacity at these sites and in case of serious injuries the only option is Tanzania ■ Not seeking health care services behaviour can be related to the costs associated with traveling to a health centre as it can cost up to 1,000 meticals to do the trip (very high cost)
Affordability and willingness to pay for health care	<ul style="list-style-type: none"> ■ Tanzanian health care services are more expensive ■ A considerable proportion of miners are reluctant to seek health care services because it means losing work time and therefore losing income
Non-locals, in-migrants	<ul style="list-style-type: none"> ■ Health care services area is transboundary and services do not seem to discriminate against non-locals

Table 12 shows issues around health seeking behaviour (HSB) for participants of FGDs.

Table 12: Health seeking behaviour of miners according to focus group participants

Leading themes	Specific issues
Modern medicine versus traditional medicine or self-medication	<ul style="list-style-type: none"> Majority use modern medicine Some mentioned use of traditional medicine
Access to health care	<ul style="list-style-type: none"> Access to health care is very limited Access to essential drugs (e.g. ART) is very limited (nearest public dispensary is 3 hours away and is not always stocked)
Public versus private health care facilities	<ul style="list-style-type: none"> The community health workers (public) and the private dispensary are the first points of contact for minor conditions For serious conditions, Tanzanian health care services (private) are sought as the Mozambican public health care facilities that have medical doctors and specialized equipment are located at a 10h drive In Manica, serious conditions are treated at the hospital
Affordability and willingness to pay for health care	<ul style="list-style-type: none"> Tanzanian health care services are expensive and there is the additional cost of transport. Often people cannot afford and community members mobilize to pool contributions towards covering cost of care
Pharmacies, vendors	<ul style="list-style-type: none"> A private dispensary staffed by a Tanzanian pharmacist was set up in the village to improve access to medicines

Health promotion activities

Awareness and health promotion activities often take place in the ASGM communities. According to the community members, health promotion activities have happened in the past for general health issues, for example, on vaccination, use of bednets, water and sanitation, environmental cleanliness, or HIV testing and treatment. These were delivered by community health workers or brought to them through community outreach activities led by

district level health officers. Some respondents also mentioned radio announcements or television campaigns. The exposure to health promotion activities varied between the ASGM sites visited.

There have never been any awareness raising activities on ASGM health issues in any of the sites visited. There is willingness from the side of the health care provider to have more information on ASGM health issues in order to enable them to afterwards raise awareness themselves.

Health system capacities and readiness

Capacities and readiness according to users

The majority of KIs perceived generally low capacities and readiness of the local health system to respond to ASGM related issues, including mercury poisoning. The insufficient training of

health care providers with regards to major injuries and metal poisoning, the lack of appropriate infrastructure and lack of diagnostic and treatment capacities were perceived as limitations in readiness. In contrast, some KIs (within the same mining site) perceived that there are adequate levels of competency (training) and equipment to address ASGM related health issues.

Table 13: Capacities and readiness according to key informants

Leading themes	Specific issues
(Training of) health care providers	<ul style="list-style-type: none"> ■ Lack of capacity building ■ Lack of specific training and knowledge about mining activities and main health related issues ■ The local health care unit's staff is considered to be familiar and sufficiently trained to respond to ASGM health related issues ■ There are qualified health technicians stationed in almost all health units
Health care services	<ul style="list-style-type: none"> ■ Lack of capacity to deal with problems associated with mining activities ■ Health care services deal with mining occupational problems as if they were common community diseases ■ Services available near mining camp sites are insufficient to answer workers' health needs
Equipment, diagnostics and treatment	<ul style="list-style-type: none"> ■ Lack of equipment and medicines to diagnose and treat conditions originated from mining activities ■ The local health care providers are sufficiently equipped to respond to ASGM health related issues
Availability of staff	<ul style="list-style-type: none"> ■ Lack of human resources with specific knowledge

Participants of FGDs are generally satisfied with the services provided at the local health facilities in Manica site, while in Niassa site the lack of health facilities is mentioned as a key weakness. In both sites they recognize the health care providers'

limitations in terms of diagnostic and treatment capacities. In particular, the availability of medical staff, in terms of qualification (e.g. medical doctor) was considered a barrier to readiness.

Table 14: Capacities and readiness according to focus group participants

Leading themes	Specific issues
Satisfaction	<ul style="list-style-type: none"> ■ In general people state they are satisfied with health care services; however, abundant limitations are described (see below)
Health care services	<ul style="list-style-type: none"> ■ There is no ambulance service for medical emergencies
(Training of) health care providers	<ul style="list-style-type: none"> ■ Qualifications of local health care providers is limited and there are no medical doctors
Equipment, diagnostics and treatment	<ul style="list-style-type: none"> ■ Medicines are often not available at the local level health care facilities ■ Vaccines are not always available
Women's concerns	<ul style="list-style-type: none"> ■ No obstetric services ("have to go to Tanzania")

Capacities and readiness according to providers

As shown in Table 15, most health care providers stated that almost all health care units and health professionals (apart from medical doctors) do not have specific training to readily respond to ASGM-related diseases and health problems and that having individuals on site with specific training in life support and first aid interventions would be very important to strengthen readiness and

responsiveness. According to providers, distance between mining camps and health care services, lack of proper medical equipment to diagnose and shortage of important medicines to treat conditions related to ASGM activities were considered to be the main obstacles to achieve greater response capacity and readiness. Specifically on mercury poisoning, opinions were mixed about the competency of health workers to diagnose and treat mercury poisoning, while there was a consensus on the limited capacity to diagnose and treat.

Table 15: Capacities and readiness according to providers at local level

Leading themes	Specific issues
Training of health care workers	<ul style="list-style-type: none"> ■ The medical technicians posted at health care units (i.e. Lupilichi) do not have the training required to answer specific questions related to mining activities, since the training received does not include diseases associated with mining activities ■ Medical doctors are already sufficiently familiar and sufficiently trained to respond to ASGM related health issues (i.e. at the Metangula Health Center) ■ Local health professionals consider that they need more training about health aspects related to mining activities because there is a lack of understanding about all the risks associated with all stages of the mining process ■ The local health care unit’s staff is unprepared to respond to ASGM health related issues, mainly due to lack of knowledge and information about occupational health hazards attributed to ASGM activities ■ There is specific need for training in basic life support and primary care interventions
Reporting	<ul style="list-style-type: none"> ■ Weak data collection and reporting at health unit level ■ ASGM occupation tends to not be registered ■ Generally weak health information system (incomplete reporting; delayed reporting; data inaccuracy; limited data analysis and no analysis specific to ASGM populations or issues)
Health care services	<ul style="list-style-type: none"> ■ The health care system is well structured and is responsive; however, close to mining sites health care infrastructures are deficient and the responsiveness is therefore insufficient ■ The local health care system is not capable to respond to ASGM health related issues
Equipment, diagnostics and treatment	<ul style="list-style-type: none"> ■ Lack of equipment and medicines to diagnose and treat conditions originated from mining activities, particularly in smaller units close to mining activities (i.e. Lupilichi) ■ Lack of specific medication for the treatment of chemical poisoning ■ General equipment and auxiliary means of diagnostic available are not sufficient ■ It is impossible to treat fractures (i.e. reduction and immobilization with plaster) in local units close to mining sites ■ There are no injectable drugs in local units close to mining sites ■ The local health care providers are not sufficiently equipped to respond to ASGM health related issues

Table 16: Capacities and readiness according to providers at provincial level (Manica)

Leading themes	Specific issues
Training of health care workers	<ul style="list-style-type: none"> Health professionals have not received specific training on ASGM-related issues but nonetheless state they are familiar with ASGM health issues No staff that is trained specifically for mercury or cyanide intoxications
Equipment, diagnostics and treatment	<ul style="list-style-type: none"> No equipment or medication available to treat mercury contamination or serious injuries

Lessons learnt with regards to the health facility assessments:

- It was challenging to identify a person at the level of the referral facility that (a) has enough time to participate and (b) would be the ideal respondent for all questions since

the referral hospital is organized in specialised departments.

- It was challenging to obtain health statistics of the health facilities visited due to factors, including unavailability of the data at the time of the visit or health workers' unavailability to share statistics without formal approval of the relevant hierarchical level.

Health facility assessments

The HFA covering human resources, services, infrastructures, medical equipment, diagnostic capacities and drug availability at local level in the ASGM sites is shown in Table 17.

In the Niassa site, the remoteness of the mining communities resulted in very limited access to health facilities. The closest health facility was a health centre located around 2 hours' drive from the mining communities and staffed with medical technician and one auxiliary person. The formal referral facility was the district health centre located an additional 8-10 hours' drive in Metangula. This meant that miners preferred to travel to Tanzania (1 hour drive to the border and another hour to the nearest health facility) to seek private medical care in health facilities staffed by medical doctors and, reportedly, with diagnostic and treatment equipment. These Tanzanian health facilities were not visited as part of this rapid assessment.

The local health facility visited in relation to the Niassa site had neither a qualified medical doctor, nurse nor midwife. Instead, human resources present were one medical technician and one auxiliary staff who were trained to render services, many times outside their area of expertise. In Metangula, there were at least 4 medical doctors (general practitioners) and 15 nurses, among other health professionals.

Services offered closest to Niassa site cover primary health care, including immunization, HIV testing and counselling, TB diagnosis and treatment, family planning and pharmacy services. Apart from these, in- and out-patient, emergency, blood transfusion, neonatal care, general surgery and uncomplicated trauma services were offered in the Metangula health care facility. In Metangula there are also 2 ambulances that cover all districts. More importantly, **none of the facilities had running water**, which was a significant limitation for the proper and hygienic operation of the facilities. None of the facilities had a laboratory, limiting the diagnostic capacity of these health care services.

In line with the potential risk of high STI and HIV rates seen in many ASGM contexts, HIV-testing using RDTs was offered in both facilities, though care and treatment was only offered in Metangula. Both facilities reported that they do not handle chemical intoxications since they do not have the proper knowledge, equipment and medicines to treat these conditions. Chelators (DMPS, DMSA) for mercury intoxication or antidotes for cyanide intoxication were not available. Anything that was beyond the scope of the health care provider and facility is referred to the respective referral hospitals.

In Manica district, the closest health facilities to mining sites were located around 40 to 50 minutes' drive. The formal first response referral facility was the district hospital of Manica, supported by the

FIELD STUDY FINDINGS

Chimoio provincial hospital as referral unit for more severe cases.

The local health facility visited in relation to the Manica site (Centro de Saúde de Nhamachato) had neither a qualified medical doctor, nurse nor midwife. Instead, human resources present were two nurses who render all services needed or triage patients to refer to the district hospital. In the Manica district hospital, there were at least 5 medical doctors (general practitioners), 21 nurses and 9 midwives, among other health professionals.

Services offered closest to Manica mining site cover outpatient consultations, emergency services, primary health care services (including immunization, HIV testing and counselling, TB diagnosis and treatment and family planning). Apart from these, inpatient, ambulance and emergency, blood transfusion, neonatal care, pharmacy, intensive care, laboratory, radiology and general

trauma services were offered in the Manica district hospital facility. Only the hospital had running water from the public network and a diagnostic tests laboratory, contributing to the overall diagnostic capacity of these facilities.

In line with the potential risk of high STI and HIV rates seen in many ASGM contexts, HIV-testing using RDTs was offered in both facilities, though care and treatment was only offered in the Manica district hospital. Both facilities reported that they do not handle chemical intoxications since they do not have the proper knowledge, equipment and medicines to treat these conditions. Chelators (DMPS, DMSA) for mercury intoxication or antidotes for cyanide intoxication were not available.

Overall, the health facilities at local and district level show limited readiness to recognize, diagnose and care for typical ASGM-related health risks and health issues such as traumas and chemical intoxication.

Table 17: Health facility assessment at local level

Health facility	Centro de Saúde de Nhamachato	Hospital Distrital de Manica	Centro de Saúde de Lupilichi	Centro de Saúde Metangula Sede
A. Basic information				
District	Manica	Manica	Lago	Lago
Locality	Maridza	Manica	Lupilichi	Metangula
ASGM site	Manica, Munhena	Manica, Munhena	Lupilichi – Minas Mpapa	Minas Mpapa
Type of facility	Type II	Type II	Health Center	Headquarter Health Center (referral unit in Lago district)
Interview date	13.09.2019	17.09.2019	18.08.2019	14.08.2019
Duration of existence of health facility (in years)	27	Unknown	Unknown	Unknown
Catchment population of the health facility:	14,000	37,995	Unknown	Lago district population as reference
B. Human resources availability: How many of the following human resources are available in your facility?				
Community health worker (CHW)	2	52	1	34
Laboratory technician	0	6	0	9
Other	Medicine Agent and Service Agent	None	Auxiliary	Statistician

Health facility	Centro de Saúde de Nhamachato	Hospital Distrital de Manica	Centro de Saúde de Lupilichi	Centro de Saúde Metangula Sede
C. Which health services are offered in your facility?				
Outpatient services	Yes	Yes	No	Yes
Inpatient services	No	Yes	No	Yes
24-hour emergency services	Yes	Yes	Despite the HF not being open 24h, the health technician lives on site and is available to attend to medical emergencies	Yes
Ambulance services (functioning 24/7)	No	Yes	No	Yes
Blood transfusion	No	Yes	No	Yes
Primary health care services	Yes	Yes	Yes	Yes
Neonatal resuscitation with bag and mask	No	Yes	No	Yes
Immunization services	Yes	Yes	Yes, in accordance with PNV	Yes
HIV testing and counselling	Yes	Yes	Yes	Yes
Family planning services	Yes	Yes	Yes	Yes
Pharmacy	No	Yes	Yes	Yes
Intensive care	No	Intermediary services	No	No
Laboratory diagnostic tests	No	Yes	Just rapid test for malaria and syphilis tests	Yes, for TB, HIV, malaria, liver function and urinalysis (not available at the moment)
General surgery	No	No	No	Starts next week
Emergency trauma/ surgical care	No	No	No	No
Radiology	No	Yes	No	No
Diagnosis, treatment and treatment supervision of TB	Yes	Yes	Yes	Yes
Diagnosis or management of non-communicable diseases, such as diabetes, cardiovascular disease, or chronic respiratory disease	No	Yes	No	Yes
Diagnosis of mercury exposure in whole blood or urine	No	No	No	No

FIELD STUDY FINDINGS

Health facility	Centro de Saúde de Nhamachato	Hospital Distrital de Manica	Centro de Saúde de Lupilichi	Centro de Saúde Metangula Sede
Basic occupational health services	No	No	No	Preventive medicine technicians doing talks and giving advice
Trauma: Services in case of falls from height and explosion	No	Yes	No	No
Screening of neurological disorders	No	Yes	No	1 psychiatry agent
Screening of pneumoconiosis (interstitial lung diseases) through chest radiography or CT	No	Yes	No	No
Loss of hearing, deafness	No	No	No	No
Disease caused by vibration	No	No	No	No
Trauma: Electric shock	No	No	No	Internal management – just stabilizing non-urgent cases
Trauma: Limb, bone fracture	No	Yes	No	Yes
Trauma: Brain injury	No	Yes	No	No
Trauma: Spinal injury	No	Yes	No	No
Trauma: Wounds caused by cutting, hitting and sticking	No	Yes	No	Internal management
Trauma: Burns	No	Yes	Basic care for first-degree wounds	Internal management – second- and third-degree wounds have been observed
Chemical poisoning	No	Yes	No	No
Others	No	Unknown	No	Unknown
D. Service usage				
Number of inpatient beds:	3	98	2	24
Total number of inpatients (last year):	Unknown	4,500	Unknown	4,380
What is the estimated percentage of ASM among total inpatients?	40%	Unknown	Unknown	Unknown
Total number of outpatients (last year):	18,000	43,200	10,400	73,000
What is the percentage of ASM among total patients?	40%	Unknown	Unknown	Unknown

Health facility	Centro de Saúde de Nhamachato	Hospital Distrital de Manica	Centro de Saúde de Lupilichi	Centro de Saúde Metangula Sede
Number of emergency calls for accidents (monthly average):	10-15 accidents	Unknown	1-2 accidents	8-12 accidents
Of which, accidents among ASM:	12 accidents	Unknown	Almost none	Unknown, but probably few or none
E. Infrastructure				
Does this facility have a cellular phone or a private cellular phone that is supported by the facility?	No	No	No	Yes
Is there regular/reliable running water?	Yes, fountain	Yes	No	No
What is the source of electricity?	Solar panel	Public network	Solar panel	Public network
Functioning refrigerator	Yes	Yes	Yes	Yes
Does this facility have a functional ambulance or other vehicle for ambulance services?	No	Yes	No	Yes
Is fuel available for its functionality?	NA	Yes	NA	Yes
F. Which medical equipment is available and functional in your health facility?				
Scale for adults	No	Yes	Yes	Yes
Digital blood pressure apparatus	Yes	Yes	Yes	Yes
Glucometer	No	No	No	No
Pulse oximeter	No	No	No	No
Oxygen concentrator	No	No	No	Broken at the moment
Oxygen cylinders	No	No	No	Not always – yes at the moment
Intravenous infusion kit / IV sets	Yes	Yes	Yes	Yes
Anaesthesia equipment	No	No	No	Yes
Sterile gloves	Yes	Yes	Yes	Yes
Cyanides poisoning antidote	No	No	No	No
Artificial breathing machine	No	No	No	Yes
Manometer	No	Yes	Yes	Yes
Headrest	No	No	No	Yes
Aspirator (electric, pedal)	No	Yes	No	Yes – electric
Pressure cooker for sterilization	Yes (deficient)	Yes	No	Yes – electric autoclave

FIELD STUDY FINDINGS

Health facility	Centro de Saúde de Nhamachato	Hospital Distrital de Manica	Centro de Saúde de Lupilichi	Centro de Saúde Metangula Sede
G. Drug availability: Which drugs are available in your facility?				
ART (Zidovudine, Nevirapine, Efavirenz)	Yes	Yes	No	No
TB drugs (first-line)	Yes	Yes	No	Yes
TB drugs (second-line)	Yes	Yes	No	No
Oxytocin / Misoprostol	Yes	Yes	Yes	Yes
Penicillin / Ampicillin / Benzadine	Yes	Yes	Yes	Yes – all
Erythromycin	Yes	Yes	Yes	Yes
Doxycycline	Yes	Yes	Yes	Yes
Vitamin A	Yes	Yes	Yes	Yes
Vitamin K	Yes	Yes	No	Yes
Hypertension drugs	Yes	Yes	No	Yes – Methyldopa
Antipyretics (anti-fever)	Yes	Yes	Yes	Yes
Diazepam (Valium)	Yes	Yes	Yes	Yes – also in pills
Injectable magnesium sulphate or other anticonvulsant	No	No	No	Yes – Injectable magnesium sulphate
Ergometrine injection	No	No	No	No
Adrenaline injection	Yes	No	No	Yes
Anti-histaminic	Yes	Yes	Yes	Yes
ACE inhibitors (Enalapril)	No	No	No	No
Thiazides	Yes	No	No	No
Calcium channel blockers (Amlodipine)	No	Yes	No	No
Salbutamol inhaler	Yes	Yes	No	Yes
Beclomethasone inhaler	Yes	No	No	No
Prednisolone capsules	No	Yes	Yes	Yes
Hydrocortisone capsules	No	Yes	No	Yes – pills
Epinephrine injection	No	No	No	Yes
Amoxicillin 500mg	Yes	Yes	Yes	Yes
Atenolol 50mg cap/tab (beta-blocker, angina, hypertension)	No	No	No	No
Captopril 25mg cap/tab (vasodilator, cardiac hypertension)	No	No	No	No
Ceftriaxone injection 1g (antibiotic injection)	No	Yes	No	Yes

Health facility	Centro de Saúde de Nhamachato	Hospital Distrital de Manica	Centro de Saúde de Lupilichi	Centro de Saúde Metangula Sede
Ciprofloxacin 500mg cap/tab	Yes	Yes	Yes	Yes
Ko-trimoxazole suspension	Yes	Yes	Yes	Yes
Diazepam 5mg cap/tab	Yes	Yes	Yes	Yes
Diclofenac 50/75mg (Voltaren)	Yes	Yes	No	Yes
Omeprazole	No	Yes	No	Yes
Paracetamol	Yes	Yes	Yes	Yes
Sodium chloride solution injection	Yes	Yes	Yes	Yes
Calcium gluconate solution injection	Yes	No	Unknown	No
Penicillin injection	Yes	Yes	No	Yes
Gentamycin injection	No	Yes	No	Yes
Betamethasone / Dexamethasone injection	No	No	No	Yes – betamethasone
Nifedipine	No	Yes	No	No
Chelators for mercury (DMPS, DMSA)	No	No	No	No
Antidotes for cyanide	No	No	No	No
H. Diagnostic availability				
Blood glucose level	No	Yes	No	No – in case of necessity sends sample to Hospital Provincial de Lichinga
Urine protein level	No	No	No	Not at the moment
Urine ketone dipstick tests	No	No	No	Not at the moment
Liver function tests	No	Yes	No	No, just in Lichinga
Renal function tests	No	No	No	No, just in Lichinga
Test for chemical poisoning	No	No	No	No
Blood chemistry analyser	No	No	No	No
Centrifuge	No	Yes	No	No
Specific tests of liver function	No	No	No	No
Specific tests of kidney function	No	No	No	No
Hemoglobin testing	No	Yes	No	Yes
Colorimeter and hemoglobinometer	No	No	No	Yes, hemoglobinometer

FIELD STUDY FINDINGS

Health facility	Centro de Saúde de Nhamachato	Hospital Distrital de Manica	Centro de Saúde de Lupilichi	Centro de Saúde Metangula Sede
Hemoglobin rapid test	No	No	No	No
Full blood count and differential testing	No	Yes	No	No
ABO blood grouping testing	No	Yes	No	Yes
TB testing (microscopy or GeneXpert)	No	No	No	Yes
Gram stains	No	Yes	No	No
Light microscopy	No	Yes	No	Yes
Glass slides and coverslips	No	Yes	No	Yes
Electrocardiogram (ECG)	No	No	No	No
I. Care and referral systems in place				
What is the procedure in a suspected case of mercury poisoning?	No guideline for reference	No guideline for reference	No guideline for reference	No guideline for reference – internal management
What is the (referral) procedure in case of burns?	Washing – sulfadiazine application	Depending on the grade (grave cases go to HPC)	No guideline for referral	No guideline for reference – internal management. Urgent cases can be referred to Lichinga upon clinical evaluation and decision
What is the (referral) procedure in case of trauma (e.g. compound fracture, severe injury, etc.)?	Transfer to HD Manica	Referral to the HPC	No guideline for referral	No guideline for reference – internal management. Urgent cases can be referred to Lichinga upon clinical evaluation and decision
Proximity of referral hospital (in hours/minutes by motorized transport)	40 minutes	40-50 minutes	6-8 hours (Metangula), 2-3 hours (Tanzania)	90 minutes (Lichinga)
Transportation possibility to referral hospital offered by your facility	No	Yes	No	Yes
Cost of referral in local currency (both ways):	1,120 meticals	2.652 meticals	5 meticals for consultation, treatment/free medicines	No costs

Health system priority needs

Among all health issues discussed, KIs and FGDs participants were asked about perceived health system priority needs.

Table 18: Health system priority needs according to key informants

Leading themes	Specific issues
Awareness	<ul style="list-style-type: none"> ■ Develop community interventions with qualified health professionals to raise awareness and organize health promotion activities within mining communities and with miners about the various health risks and forms of protection, on regular basis ■ Miners should all wear PPE, including boots, a mask, goggles, gloves and a helmet ■ Raise awareness about the use of mosquito nets to prevent malaria
(Training of) health care workers	<ul style="list-style-type: none"> ■ Increase the number of health professionals in local facilities ■ Training of health technicians ■ Community health workers need more training ■ Health care workers should have training in basic life support
Infrastructure	<ul style="list-style-type: none"> ■ Government is responsible for taking steps to further empower the health units ■ Requalify some health facilities, for example, Cobu� health unit should have more capacity, including inpatient and radiography ■ Build health units closer to mining sites ■ Build better road accesses to existing health units ■ Build a bridge to improve access to Lupilichi during the rainy season ■ There should be a health unit in the sites to better strengthen the health care available to miners ■ Transport units to evacuate victims of accidents ■ Improve or increase the physical capacity of existent health units
Equipment, diagnostics and treatment	<ul style="list-style-type: none"> ■ All kinds of materials should be available in health facilities, including the right drugs and the human resources that have specific knowledge about ASGM activities health-related issues ■ Community-based health units need more equipment to better diagnose and treat prevalent diseases in mining camps ■ Health facilities should be provided with the diagnostic tools and materials needed to respond to ASGM-related questions (i.e. radiography) ■ Mines should all have a first aid kit and people trained in first aid ■ Local health units should be able to diagnose and treat poisoning by chemicals used in the ASGM processes ■ Hospital should have more beds, cervical collars, immobilization material, guidelines to treat poisoning by minerals
Non-mining related	<ul style="list-style-type: none"> ■ Intersectoral ministerial work across health, mineral resources and environmental areas

The main priority need as noted by FGDs participants was the availability of health care providers, including medical doctors, nurses and midwives (Table 19). In addition, availability of diagnostics and treatment, health education in communities and better access to health care for remote communities

were perceived priority needs. Besides the health system issues, training of ASGM miners in first aid care and increasing availability of first aid kits was also regarded as a priority, along with providing emergency transport from mining communities, safe drinking water and safe sanitation.

Table 19: Health system priority needs according to focus group participants

Leading themes	Specific issues
(Training of) health care workers	<ul style="list-style-type: none"> ■ Provide adequate and permanent health care personnel in the facilities, i.e. medical doctors, nurses, midwives ■ Train miners in first aid care and provide first aid kits to mining camps
Prevention	<ul style="list-style-type: none"> ■ Distribute ITN to miners that sleep near the mines and in mining communities ■ Provide PPE to miners
Equipment, diagnostics and treatment	<ul style="list-style-type: none"> ■ Ensure sufficient medical supply for diagnosis and treatment ■ Ensure availability of medicines at all times (proper stock management) ■ Provide emergency transport in mining communities
Awareness	<ul style="list-style-type: none"> ■ Provide health education in communities
Infrastructure	<ul style="list-style-type: none"> ■ Provide health infrastructures in villages that do not have health facilities yet and are remote
Non-mining related	<ul style="list-style-type: none"> ■ Provision of safe drinking water ■ Provision of safe sanitation

Institutional and stakeholder aspects

Mining associations

In the Niassa site, miners work under the umbrella of two mining associations, with 12 and 9 members, respectively. Over and above these members, around 80 additional miners also work as collaborators of these associations but this number varies over the year as some collaborators only work in mining occasionally to earn extra income.

Mining associations are also involved in community development initiatives, for example, sponsoring the development of social infrastructure such as an expansion to the local health centre. There is local ambition to turn the associations into cooperatives (the cooperative can already make use of heavier machinery to assist the mining process), and one interviewee was confident that this status could be achieved during the next year (2020).

In the Manica site there is one known local organization of miners. This mining organization works as a society and it is composed of 80 members, of which 10 are part of the directorate board. The organization was regarded as beneficial to the mining community since it could allow in the future, for example, training of first aid responders among mining crews and teaching the mining

community about occupational hazards, protection equipment and safety procedures.

Government

KIs and FGDs participants reported that there are little government activities with regards to ASGM activities and related issues such as health. It is believed that the government could do more for the ASGM communities. Although there are regulations in place in the country regarding for instance banning of minors working in ASGM, sometimes it is considered insufficient. One KI pointed out government organized events promoting exchange of experiences between Manica and Niassa and that sometimes mineral resources technicians would go to the camps to see if they are indeed applying good practices, though currently this work is not done due to lack of funds.

Inter-sectoral and inter-organizational collaboration

Some KIs feel that inter-sectoral and inter-organizational collaborations are crucial to achieve positive changes in the ASGM sector while others believe that every organization works towards its own goals.

The Minamata Convention and the associated development of the NAP has brought a new dynamic for inter-sectoral and inter-organizational collaborations. In fact, the Minamata Convention – overseen by the project steering committee – kicked off the inter-ministerial collaboration, including ministries of health, environment, water resources, agriculture, information, government agencies like Customs and Immigration, as well as the local government authorities. Furthermore, organizations such as WHO, UNIDO, MMSD, as well as academic

institutions or NGOs are participating in the NAP process.

Community initiatives

KIs and FGDs participants were asked what the ASGM communities could do themselves, to improve their situation, especially their health situation. Propositions made are listed in Table 20 below.

Table 20: Proposed community initiatives

Leading themes	Specific issues
Awareness rising	<ul style="list-style-type: none"> ■ The miners should be more careful and follow guidelines for mining activities more closely ■ Miners should be more informed about the risks and consequences associated with some of their behaviours ■ Miners should be followed by health services on a regular basis ■ Practice more environmental protection activities (i.e. cleaning up trash, standing waters, etc.) ■ Actively seek health attention whenever in need, not delaying or withholding treatment ■ Improve personal hygiene in communities and camps ■ Improve the use of latrines ■ Increase the use of condoms among mining workers ■ Increase the use of mosquito nets
Personal protective equipment	<ul style="list-style-type: none"> ■ Miners should use effective PPE ■ Miners should use respiratory protection masks at all times
Safer techniques	<ul style="list-style-type: none"> ■ Government technicians must teach workers how to stay protected while working on the mine
Common financial investments	<ul style="list-style-type: none"> ■ Find a way to develop a health facility closer to the camps, for example, by building the infrastructure for the government, province or district to deploy health professionals there ■ Build decantation and retention basins in rivers ■ The mining community could invest in a bike ambulance, motorcycle ambulance or an ambulance for quick intervention and to leverage the existent resources for community benefit ■ Invest in a first aid kit and contribute and/or pay for a person to be trained as a rescuer and be there
Institutional opportunities	<ul style="list-style-type: none"> ■ Improve the basic sanitation system of communities
Social cohesion	<ul style="list-style-type: none"> ■ More initiatives from the communities close to ASGM activities to actively disseminate information among mine workers about occupational safety and health related issues ■ Artisanal miners should hold meetings to address health care issues and reach consensus initiatives and community level to improve health care access responsiveness to ASGM-related health problems ■ Appoint someone to serve as a link between the mining community and the health facilities for ASGM-related issues ■ Miners should organize themselves to improve their access to health care and monitor improvements to be implemented

6 Conclusions



“ The availability of medical staff, in terms of qualification (e.g. medical doctor) and lack of equipment and medicines, was considered a barrier to readiness.

”

Conclusions

In this study, two ASGM sites in Niassa and Manica provinces were visited in August and September 2019 for a rapid health situation assessment.

Hypothesis 1: There are differences between priority health concerns reported by artisanal and small-scale gold miners and the local (general) population as reported by health care providers and as reflected in local health statistics (where possible).

- The health issues reported by artisanal and small-scale gold miners and by health care providers living and working in ASGM areas were concordant most of the time. However, miners and community members described different symptoms as compared to health care providers, which might be explained by the fact that:
 - (i) miners/community members do not go to the health facility for all health issues; (ii) the description of health issues might differ between community members and medical personnel; and (iii) the health care providers have limited capacities to recognize and diagnose (due to issues of capacity, competency, availability of equipment and material) all health symptoms correctly.
- However, there is a marked difference between health issues reported by miners as compared to other ASGM community members that do not mine. Miners more often reported issues linked to their occupational risks whilst community members more often described health issues characteristic for rural settings in sub-Saharan Africa.

Hypothesis 2: Artisanal and small-scale gold miners' understanding and perceptions of the dangers of ASGM activities do not compel them to adopt safer or more environmentally friendly practices and/or pursue another activity.

- Health risk perceptions in artisanal and small-scale gold miners identified occupational hazards (e.g. falls, carbon monoxide intoxication, accidents), environmental health hazards (e.g. unsafe sanitation, unsafe drinking water), vector-related hazards (e.g. animal bites, insect bites), chemical hazards (e.g. uncertainty about effects from chemicals) and social and livelihood hazards (e.g. prostitution, alcohol abuse, food shortage, distance to health facility).
- PPE use was very low with main reasons stated being affordability and availability.

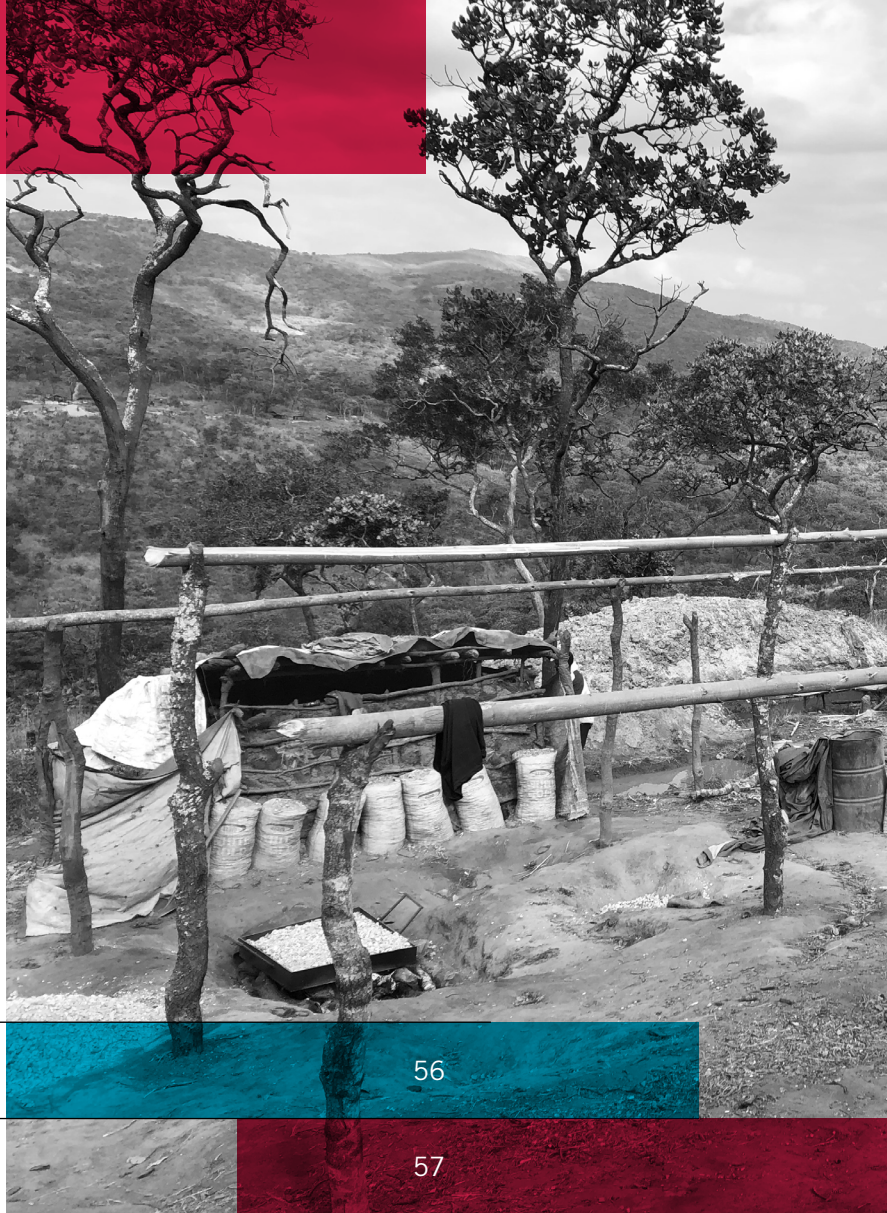
Hypothesis 3: Artisanal and small-scale gold miners, their families and the broader communities face challenges in accessing health care.

- Geographical access to health care varied between sites based on mere distance to the nearest health facility. ASG miners often attempt self-medication and home-made treatments or seek the private dispensary for small ailments and injuries. Where ASGM communities are far from health care facilities, community health workers and traditional medicine play an important role as a primary place where ASG miners sought care. When a primary health care facility is available at close distance, this is the primary place where care is sought. Unavailability of specialized diagnostic equipment, lack of medical doctors and frequent lack of medicines are some of the reasons pointed out by this group. In the site in Niassa, miners prefer to cross the border to Tanzania, where better, well-staffed facilities are available at closer distance.

Hypothesis 4: The health care system, in particular at the local level (i.e. near to ASGM communities) is insufficiently capacitated to address health problems specific to artisanal and small-scale gold miners. Regional and local differences in capacity might also exist.

- Overall, the health facilities at local and district level show limited readiness to recognize, diagnose and care for typical ASGM-related health risks and health issues such as traumas and chemical intoxication.
- According to the HFA, the capacity and readiness of the health system to address health problems specific to artisanal and small-scale gold miners, their families and the broader communities is very limited in terms of staff with sufficient training, offered services, diagnostic abilities, treatment options and referral (including emergency) infrastructure.
- The availability of medical staff, in terms of qualification (e.g. medical doctor) and lack of equipment and medicines, was considered a barrier to readiness. In view of most KIs, there was low capacities and readiness of the local health system to respond to ASGM related issues, including mercury poisoning.
- The insufficient training of health care providers with regards to trauma and chemical intoxication was also perceived as limitations in readiness.
- Health structures at district and provincial level are better trained and equipped for biomechanical health risks but were equally limited in responding to chemically induced health issues.

7 Recommendations



In this section:

Recommendations at individual level

56

Recommendations at community level

57

Recommendations at institutional level (Ministry of Health)

57

Recommendations

A number of recommendations are formulated below at different levels of intervention, i.e. individual, community and institutional level (Ministry of Health).

This comprehensive but non-exhaustive list of recommendations can guide the selection of public health interventions within the NAP in Mozambique.

Recommendations at individual level

- The use of individual PPE is recommended to protect from injuries, such as:
 - Solid shoes: can protect from falls due to slipping and injuries due to rough ground and falling rocks, as well as protect to some extent against animal bites (snakes, scorpions).
 - Hats, helmets: a headgear can protect from sun, diminish the impact of hits and minimize the risk of injuries due to falling rocks.
 - Protective glasses: eye protection for rock breaking activities.
 - Gloves: Hand gloves when handling rocks and metal.
 - Masks: Protection from inhalation of dust and mercury fume.
- To adapt safer mining approaches to minimize risks:
 - Building of safer underground shafts through reinforcement of pits with (wooden) scaffolding or similar.
 - Ensuring oxygen supply in underground shafts.
 - Use of retorts when burning mercury amalgam.
 - Safe disposal of mercury and cyanide tailings.
- To promote environmental management and hygiene:
 - Avoid pollution of the environment by spilling mercury contaminated water and tailings into rivers used by communities for drinking, irrigation and other activities. These could be discharged at a designated area only to minimize introduction into the environment and accumulation in food chain.
 - Avoid stagnant water bodies that promote mosquito breeding.
 - Avoid open defecation at mining sites and environment.
 - Practice defecation in designated sanitary latrines.
- Understand the importance and value of personal health:
 - Adapting a safer and healthier lifestyle (including safer mining behaviours, personal hygiene, avoidance of substance abuse, practice safe sex, etc.) will avoid potential future health care costs.
 - Understanding that personal health has a value and a price. Minimal income savings will allow to cover health care and avoid economic shocks.

Miners do need support in adapting safer and healthier behaviours through awareness raising, training and facilitation (e.g. bringing the PPE closer to them).

Recommendations at community level

- Separate (ensure minimum separation between) all mining activities, including amalgam burning activities, from the community residential areas.
- Organize mining activities along traditional structures and use existing, traditional mechanisms for land use management and conflict management.
- Organize mining activities through mining associations/organizations proven functional and beneficial by other ASGM communities.
- Balance farming and mining activities in communities to ensure self-subsistence and balanced demand and supply of agricultural products.
- Creation of secondary markets that also promote safer mining such as locally sold PPE.
- Engaging in stakeholder exchanges with representatives from other sectors such as education, farming and fisheries, health and civil society. Cross-sector collaborations could help to tackle low school enrolment, low farming activity or health seeking behaviour and can increase advocacy for social and health issues within ASGM communities.
- Promote community cohesion in face of potential substantial in-migrant population.

Similar to individuals, communities will face challenges in implementing certain recommendations. Institutional frameworks will be determinant in the success in implementing community-based recommendations.

Recommendations at institutional level (Ministry of Health)

- Increase accountability of mining associations with regards to:
 - Health promotion activities, including use of PPE and safer mining techniques
 - Environmental hazard management
 - Provision of first aid for work-related accidents
 - Community engagement with regards to social activities
- Raise awareness on ASGM-related health issues at individual, community and institutional levels (including government, politicians and decision-makers, health sector, civil society sector and mining associations) through previously found effective means (e.g. radio, associations, civil society and innovative technologies).
- Provide all health facilities in ASGM areas, including referral facilities, with the training manual for health professionals entitled “Health Issues in Artisanal and Small-Scale Gold Mining” developed by the Artisanal Gold Council (AGC), UNIDO and GEF.
- Enhance investments in training of medical staff on ASGM-related health issues, provision of medical equipment, infrastructure, diagnostic and treatment capacities in local health facilities, and ensure effective referral systems to secondary and tertiary health structures.
- Build capacity and competency of community-based health workers on diagnosis, treatment, management, referral and health prevention and promotion around ASGM-related health issues and adapt/expand their health registries with ASGM-specific fields.
- Raise awareness among health professionals of the neurological symptoms that could be associated with long-term exposure to mercury and train them to correctly identify symptoms related to the exposure to mercury.
- Promote appropriate HSB in ASGM communities where appropriate services are offered, including timely health seeking, avoidance of traditional medicine and self-treatment.

RECOMMENDATIONS

- Increase health promotion activities for health issues particular to ASGM communities such as substance abuse, STIs, water and sanitation, and occupational health, including on risks of mercury and cyanide use.
- Include in the national sectoral plan the assessment to the risk groups (ASGM and surrounding community) in order to diagnose the health problems related to chronic exposure to mercury and treat the affected people.

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Annexes

Informed Consent – Key Informant

Consentimento informado: Avaliação rápida da situação da saúde das comunidades de mineração artesanal de ouro e em pequena escala

Meu nome é [nome] e sou [pessoal da saúde/mobilizador comunitário] do(a) [nome da instituição]. Estamos a convidá-lo(a) a participar no estudo sobre os problemas de saúde e comportamentos de procura de cuidados de saúde na sua comunidade. O estudo é conduzido em colaboração entre o Ministério da Saúde e a Organização Mundial de Saúde (OMS).

O estudo tem como objectivo avaliar a situação de saúde dos garimpeiros de ouro artesanal de pequena escala, suas famílias e outros membros da comunidade, determinar o comportamento de busca de cuidados de saúde. Estamos também a avaliar as capacidades e a prontidão dos serviços de saúde locais que lhes são fornecidos. Como resultado deste estudo, as recomendações para o Ministério da Saúde serão desenvolvidas para enfrentar os desafios e melhorar a situação actual das comunidades da ASGM.

As actividades do estudo incluem: (i) entrevistas com informantes-chave com profissionais que trabalham no ASGM, sectores ou autoridades de saúde ou meio ambiente, ou indivíduos conhecedores das comunidades locais; (ii) discussão em grupos focais com garimpeiros artesanais de ouro e de pequena escala, membros da família de garimpeiros de ouro artesanal e de pequena escala e outros membros da comunidade ASGM; E (iii) visitar as unidades sanitárias locais para obter estatísticas de saúde e avaliar a unidade sanitária e seus funcionários para a prontidão para abordar problemas de saúde relacionados à ASGM. Você está participando de uma entrevista de informante chave. [e Unidade Sanitária]. A entrevista será de 30-45 minutos [e de 60-120 minutos Unidade Sanitária].

Participação voluntária

Toda a participação no estudo é inteiramente voluntária. É seu direito decidir se quer ou não participar assim como é livre de abandonar o estudo a qualquer momento sem nenhuma consequência. Se o seu consentimento for suspenso após o início do estudo, você não perderá quaisquer benefícios e os seus dados colectados serão mantidos em sigilo.

Riscos

Não há riscos físicos associados ao presente estudo. O estudo actual obteve os requisitos éticos e administrativos necessários. De acordo com o protocolo do estudo, todas as autoridades nacionais, provinciais e locais relevantes e as autoridades tradicionais foram informadas e aceitaram o estudo. Você não está exposto a nenhum dano, desvantagens ou inconvenientes. Importante referir que todas as informações que você está compartilhando conosco serão estritamente confidenciais e usadas apenas para fins de pesquisa.

Benefícios

A sua participação neste estudo contribuirá para encontrar soluções para melhorar a situação de saúde das comunidades ASGM. Em Moçambique os resultados do estudo serão utilizados para garantir que o governo crie medidas para formalizar as actividades do ASGM e garantir que a saúde e o bem-estar dos dependentes da ASGM para seus meios de subsistência permaneçam protegidos.

Renumeração para participação

Você não pagará nenhum custo pela participação neste estudo. Você não será renumerado para participar deste estudo, mas uma compensação é garantida na forma de uma refeição de almoço se você participar da entrevista durante o almoço, ou sob a forma de um pagamento em dinheiro para compensar o seu envolvimento no tempo em caso de interrupção da sua atividade de trabalho. O montante proposto como compensação será razoável de acordo com o contexto socioeconômico local. Mesmo que você decida retirar do estudo, você será parcialmente compensado, com base nos procedimentos de estudo já concluídos.

Gestão de dados e confidencialidade

A confidencialidade dos seus dados é importante para os investigadores. Serão solicitados, o seu nome e assinatura para garantir que você entendeu todas as informações sobre o estudo fornecidas a você, que lhe foram explicados os riscos e benefícios da sua participação e que todas as suas perguntas foram respondidas. Seu nome, *[e o nome da sua Unidade Sanitária]* serão anotados neste formulário de consentimento. Seu nome e assinatura não serão usados e nem compartilhados com ninguém sem o seu consentimento. Nenhum nome será mencionado ou aparecerá em qualquer documentação dos achados do estudo. Todos os dados serão mantidos estritamente privados armazenados em um servidor seguro que é apenas acessível aos investigadores.

Divulgação de resultados para as comunidades

Os investigadores têm a responsabilidade de comunicar as conclusões do estudo. Os resultados serão compartilhados com o apoio do Ministério da Saúde em reuniões comunitárias ou eventos locais onde as atividades de pesquisa ocorreram através da rede de mobilizadores comunitários. Materiais educacionais e de comunicação apropriados serão desenvolvidos e disponibilizados para facilitar informações e discussões abertas em torno dos resultados da pesquisa da ASGM.

Pessoa de contacto: Se tiver alguma questão relacionada ao estudo, pode contactar: _____

Se você tiver alguma dúvida relacionada com os seus direitos, entre em contacto com o Comité Institucional de Bioética em Saúde do Instituto Nacional de Saúde - Moçambique localizado fisicamente no edifício central do Ministério da Saúde, Av. Eduardo Mondlane 1008, R/C, Maputo, ou pelo telefone (+258) [...].

Certificado de consentimento:

Eu li e entendi o formulário de Consentimento Informado e eu concordo voluntariamente em participar deste estudo.

Local e data:

Local e data:

Nome completo do entrevistado:

Nome completo do entrevistador:

Assinatura do entrevistado:

Assinatura do entrevistador:

Informed Consent – Focus Group Discussion Participant

Consentimento informado: Avaliação rápida da situação da saúde das comunidades de mineração artesanal de ouro e em pequena escala

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As actividades do estudo incluem: (i) entrevistas com informantes-chave com profissionais que trabalham no ASGM, sectores ou autoridades de saúde ou meio ambiente, ou indivíduos conhecedores das comunidades locais; (ii) discussão em grupos focais com garimpeiros artesanais de ouro e de pequena escala, membros da família de garimpeiros de ouro artesanal e de pequena escala e outros membros da comunidade ASGM; E (iii) visitar as unidades sanitárias locais para obter estatísticas de saúde e avaliar a unidade sanitária e seus funcionários para a prontidão para abordar problemas de saúde relacionados à ASGM. Você está participando de uma entrevista de informante chave. [e Unidade Sanitária]. A entrevista será de 30-45 minutos [e de 60-120 minutos Unidade Sanitária].

Participação voluntária

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Riscos

Não há riscos físicos associados ao presente estudo. O estudo actual obteve os requisitos éticos e administrativos necessários. De acordo com o protocolo do estudo, todas as autoridades nacionais, provinciais e locais relevantes e as autoridades tradicionais foram informadas e aceitaram o estudo. Você não está exposto a nenhum dano, desvantagens ou inconvenientes. Importante referir que todas as informações que você está compartilhando conosco serão estritamente confidenciais e usadas apenas para fins de pesquisa.

Benefícios

A sua participação neste estudo contribuirá para encontrar soluções para melhorar a situação de saúde das comunidades ASGM. Em Moçambique os resultados do estudo serão utilizados para garantir que o governo crie medidas para formalizar as actividades do ASGM e garantir que a saúde e o bem-estar dos dependentes da ASGM para seus meios de subsistência permaneçam protegidos.

Renumeração para participação

Você não pagará nenhum custo pela participação neste estudo. Você não será renumerado para participar deste estudo, mas uma compensação é garantida na forma de uma refeição de almoço se você participar

da entrevista durante o almoço, ou sob a forma de um pagamento em dinheiro para compensar o seu envolvimento no tempo em caso de interrupção da sua atividade de trabalho. O montante proposto como compensação será razoável de acordo com o contexto socioeconómico local. Mesmo que você decida retirar do estudo, você será parcialmente compensado, com base nos procedimentos de estudo já concluídos.

Gestão de dados e confidencialidade

A confidencialidade dos seus dados é importante para os investigadores. Serão solicitados, o seu nome e assinatura para garantir que você entendeu todas as informações sobre o estudo fornecidas a você, que lhe foram explicados os riscos e benefícios da sua participação e que todas as suas perguntas foram respondidas. Seu nome, [e o nome da sua Unidade Sanitária] serão anotados neste formulário de consentimento. Seu nome e assinatura não serão usados e nem compartilhados com ninguém sem o seu consentimento. Nenhum nome será mencionado ou aparecerá em qualquer documentação dos achados do estudo. Todos os dados serão mantidos estritamente privados armazenados em um servidor seguro que é apenas acessível aos investigadores.

Divulgação de resultados para as comunidades

Os investigadores têm a responsabilidade de comunicar as conclusões do estudo. Os resultados serão compartilhados com o apoio do Ministério da Saúde em reuniões comunitárias ou eventos locais onde as atividades de pesquisa ocorreram através da rede de mobilizadores comunitários. Materiais educacionais e de comunicação apropriados serão desenvolvidos e disponibilizados para facilitar informações e discussões abertas em torno dos resultados da pesquisa da ASGM.

Pessoa de contacto: Se tiver alguma questão relacionada ao estudo, pode contactar: _____

Se você tiver alguma dúvida relacionada com os seus direitos, entre em contacto com o Comité Institucional de Bioética em Saúde do Instituto Nacional de Saúde - Moçambique localizado fisicamente no edifício central do Ministério da Saúde, Av. Eduardo Mondlane 1008, R/C, Maputo, ou pelo telefone (+258) [...].

Certificado de consentimento:

Eu li e entendi o formulário de Consentimento Informado e eu concordo voluntariamente em participar deste estudo.

No.	Nome completo	Local e data	Assinatura
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____
8	_____	_____	_____
9	_____	_____	_____
10	_____	_____	_____
11	_____	_____	_____
12	_____	_____	_____
13	_____	_____	_____
14	_____	_____	_____
15	_____	_____	_____

KII Questionnaire – Government official

A. Informações gerais	
A1	Data da entrevista:
A2	Local da entrevista:
A3	Tipo de informante:
A4	Código do entrevistado:
A5	Função/cargo do entrevistado:
A6	Hora de início da entrevista:
A7	Nome do entrevistador:
B. Informação básica	
B1	Há quanto tempo trabalha nesta função?
B2	Sabe dizer desde quando é que se pratica mineração artesanal de ouro em pequena escala (ASGM) nesta região/distrito?
B3	Quais são as actividades de ASGM que são praticadas neste região/distrito que conhece?
C. Estado de alerta/consciência	
C1	Quais foram as implicações ambientais que a ASGM teve nas comunidades locais?
C2	Quais foram as implicações sociais que a ASGM teve nas comunidades locais?
C3	Quais foram as implicações económicas que a ASGM teve nas comunidades locais?
C4	Quais foram as implicações para a saúde que a ASGM teve nas comunidades locais?
D. Capacidade e estado de prontidão do sistema de saúde	
D1	Na sua opinião, o serviço nacional de saúde actualmente é capaz de responder a questões de saúde relacionadas com a ASGM?
D2	Onde é que vê as necessidades mais urgentes para melhorar as capacidades e estado de prontidão do sistema de saúde para responder as questões de saúde relacionadas a ASGM?
	<ul style="list-style-type: none"> ■ Quem é responsável por tomar as medidas para melhorar? ■ Qual é o compromisso político necessário, e de que sector?
D3	Na sua opinião, acha que os provedores de cuidados de saúde a nível local nas unidades sanitárias estão familiarizados e suficientemente treinados para responder a questões de saúde relacionadas com ASGM?
	<ul style="list-style-type: none"> ■ Se não, porque não? ■ Se não, o que pode ser feito para melhorar a situação?
D4	Na sua opinião, pensa que as unidades sanitárias locais estão suficientemente equipadas para responder a questões de saúde relacionadas a ASGM? (Antídotos para mercúrio e cianetos, centro cirúrgico, ambulâncias, etc?)
D5	O que podem fazer os próprios mineiros artesanais de ouro de pequena escala e os membros da comunidade para melhorar as questões de saúde relacionadas com a ASGM?

E. Nível Político	
E1	Em termos de questões de saúde relacionadas a ASGM, o que já foi feito no passado, o vem sendo feito e o que se planifica fazer no futuro a nível nacional e local para abordar estas questões? O que é feito na sua região/distrito em particular?
E2	Na sua opinião, quais são os sectores que devem trabalhar em colaboração para abordar as questões de saúde relacionadas com a ASGM? <ul style="list-style-type: none"> ■ Actualmente esta colaboração inter-sectorial tem acontecido? ■ Se sim, como é feita e quais são os intervenientes? ■ Se não, porque não?
E3	Pensa que a ASGM e as suas questões associadas, incluindo o uso do mercúrio são abordadas com suficiente participação do sector público, privado e sociedade civil?
E4	Pensa que a ASGM e as suas questões associadas, incluindo o uso do mercúrio são abordadas com suficiente participação dos ministérios relevantes (exemplo ministério da economia e finanças, ministério da terra, ambiente e desenvolvimento rural, ministério da saúde, ministério dos recursos minerais e energia, e ministério da criança, género e acção social)?
F. Fim da entrevista	
F1	Tem alguma questão que queira fazer?
F2	Obrigada pela sua participação.
F3	Coordenadas de GPS
F4	Hora do fim da entrevista
G. Observações do Entrevistador	
G1	Outras observações/anotações do entrevistador:

KII Questionnaire – Health authority official

A. Informações gerais	
A1	Data da entrevista:
A2	Tipo de informante:
A3	Local da entrevista:
A4	Código do entrevistado:
A5	Função/cargo exactos do entrevistado:
A6	Hora de início da entrevista:
A7	Nome do entrevistador:
B. Informação básica	
B1	Há quanto tempo trabalha neste distrito/região?

B2	Sabe dizer desde quando é que se pratica mineração artesanal de ouro em pequena escala (ASGM) nesta região/distrito?
B3	Quais são as actividades de ASGM que são praticadas neste região/distrito que conhece?
C. Estado de alerta/consciência	
C1	Na sua opinião, quais são os maiores riscos para a saúde para a população em geral (comunidade)?
	<i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i>
C2	Na sua opinião, quais são os riscos da ASGM em particular? <i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i>
C3	Quais são as implicações que a ASGM trouxe para a saúde das comunidades locais?
	■ Também devido a alterações ambientais, sociais e económicas resultants das actividades de ASGM?
C4	Na sua opinião, quais são os grupos marginalizados, negligenciados e estigmatizados na comunidade no que se refere a saúde e ao acesso aos cuidados de saúde?
	<i>Sondar sobre os mineiros artesanais de ouro e em pequena escala.</i>
C5	Na sua opinião, os mineiros artesanais de ouro e em pequena escala procuram cuidados médicos ou tratamento quando indicado?
	■ Se não, porque não? Quais são os factores que determinam a procura ou não de cuidados médicos e tratamento?
	■ Se não, o que mais eles fazem?
D. Capacidade e estado de prontidão do sistema de saúde	
D1	Na sua opinião, o sistema de saúde actualmente é capaz de responder as questões de saúde relacionadas com ASGM?
D2	Onde é que vê as necessidades mais urgentes para melhorar as capacidades e estado de prontidão do sistema de saúde para responder as questões de saúde relacionadas a ASGM?
	■ Quem é responsável por tomar as medidas para melhorias?
	■ Qual é o compromisso político necessário, e de que sector?
D3	Na sua opinião, acha que os provedores de cuidados de saúde a nível local nas unidades sanitárias estão familiarizados e suficientemente treinados para responder a questões de saúde relacionadas com ASGM?
	■ Se não, porque não?
	■ Se não, o que pode ser feito para melhorar a situação?
D4	Na sua opinião, pensa que as unidades sanitárias locais estão suficientemente equipadas para responder a questões de saúde relacionadas a ASGM? (antídotos para mercúrio e cianetos, centro cirúrgico, ambulâncias, etc?)
D5	O que podem fazer os próprios mineiros artesanais de ouro de pequena escala e os membros da comunidade para melhorar as questões de saúde relacionadas com a ASGM?
D6	Em termos de questões de saúde relacionadas a ASGM, o que já foi feito no passado, o vem sendo feito e o que se planifica fazer no futuro a nível nacional e local para abordar estas questões?
	■ O que é feito na sua região/distrito em particular?
D7	Na sua opinião, quais são os sectores que devem trabalhar em colaboração para abordar as questões de saúde relacionadas com a ASGM?
	■ Actualmente esta colaboração inter-sectorial tem acontecido?
	■ Se sim, como é feita e quais os intervenientes?
	■ Se não, porque não?

E. Fim da entrevista	
E1	Tem alguma questão que queira fazer?
E2	Obrigada pela sua participação.
E3	Coordenadas de GPS
E4	Hora do fim da entrevista
F. Observações do Entrevistador	
F1	Outras observações/anotações do entrevistador:

KII Questionnaire – Environmental (health) authority official

A. Informações gerais	
A1	Data da entrevista:
A2	Tipo de informante:
A3	Local da entrevista:
A4	Código do entrevistado:
A5	Função/cargo exactos do entrevistado:
A6	Hora de início da entrevista:
A7	Nome do entrevistador:
B. Informação básica	
B1	Há quanto tempo trabalha nesta região/distrito?
B2	Sabe dizer desde quando é que se pratica mineração artesanal de ouro em pequena escala (ASGM) nesta região/distrito?
B3	Quais são as actividades de ASGM que são praticadas nesta região/distrito que conhece?
C. Estado de Alerta/consciência	
C1	Na sua opinião, quais são os maiores riscos para a saúde para a população em geral (comunidade)?
	<i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i>
C2	Na sua opinião, quais são os riscos da ASGM em particular? Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.
C3	Na sua opinião, quais são os grupos marginalizados, negligenciados e estigmatizados na comunidade no que se refere a saúde e ao acesso aos cuidados de saúde?
	<i>Sondar sobre os mineiros artesanais de ouro e em pequena escala.</i>

	Na sua opinião, os mineiros artesanais de ouro e em pequena escala procuram cuidados médicos ou tratamento quando indicado?
C4	<ul style="list-style-type: none"> ■ Se não, porque não? Quais são os factores que determinam a procura ou não de cuidados médicos e tratamento? ■ Se não, o que mais eles fazem?
D. Questões ambientais	
D1	<p>Neste âmbito, qual é a origem das diferentes vias de poluição ambiental que são causadas pelo ASGM (ou seja, ambiente poluído a partir da origem)</p> <p><i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i></p>
D2	<p>Neste âmbito, quais são as diferentes formas directas e indirectas de exposição em diferentes grupos comunitários, ou seja, mineiros artesanais de ouro e de pequena escala e outros membros da comunidade e crianças?</p> <p><i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i></p>
D3	<p>Sente que as comunidades locais entendem o conceito de poluição ambiental pelo mercúrio usado na ASGM?</p> <p><i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i></p>
E. Questões de saúde	
E1	<p>Sente que os mineiros artesanais de ouro e em pequena escala entendem as consequências para a saúde resultantes da poluição ambiental do mercúrio usado na ASGM?</p> <ul style="list-style-type: none"> ■ Se não, porque não?
E2	<p>Sente que as comunidades locais entendem as consequências para a saúde resultantes da poluição ambiental do mercúrio usado na ASGM?</p> <ul style="list-style-type: none"> ■ Se não, porque não?
E3	<p>Sente que os provedores locais de cuidados de saúde entendem as consequências para a saúde resultantes da poluição ambiental do mercúrio usado na ASGM?</p> <ul style="list-style-type: none"> ■ Se não, porque não?
E4	Onde você veria uma necessidade urgente de acção para abordar a saúde dos mineiros artesanais de ouro e de pequena escala e da saúde da comunidade em geral?
F. Capacidade e prontidão do sistema público de saúde	
F1	Na sua opinião, o sistema de saúde no seu estágio actual é capaz de responder as questões de saúde relacionadas com ASGM?
F2	O que podem fazer os próprios mineiros artesanais de ouro de pequena escala e os membros da comunidade para melhorar as questões de saúde relacionadas com a ASGM?
F3	<p>Em termos de questões de saúde relacionadas a ASGM, o que já foi feito no passado, o vem sendo feito e o que se planifica fazer no futuro a nível nacional e local para abordar estas questões?</p> <ul style="list-style-type: none"> ■ O que é feito na sua região/distrito em particular?
F4	<p>Na sua opinião, quais são os sectores que devem trabalhar em colaboração para abordar as questões de saúde relacionadas com a ASGM?</p> <ul style="list-style-type: none"> ■ Actualmente esta colaboração inter-sectorial tem acontecido? ■ Se sim, como é feita e quais os intervenientes? ■ Se não, porque não?

F5	No [Ministério onde trabalha o entrevistado] quais são as questões de saúde ambiental (relacionadas com ASGM) que são especificamente abordadas e como?
G. Fim da entrevista	
G1	Tem alguma questão que queira fazer?
G2	Obrigada pela sua participação.
G3	Coordenadas de GPS
G4	Hora do fim da entrevista
H. Observações do entrevistador:	
H1	Outras observações/anotações do entrevistador:

KII Questionnaire – Health care provider

A. Informações gerais	
A1	Data da entrevista:
A2	Tipo de informante:
A3	Local e nome da unidade sanitária:
A4	Código do entrevistado:
A5	Hora de início da entrevista:
A6	Nome do entrevistador:
B. Informação básica	
B1	Há quanto tempo trabalha nesta comunidade ou unidade sanitária?
B2	Sabe dizer desde quando é que se pratica mineração artesanal de ouro em pequena escala (ASGM) nesta comunidade?
B3	Quais são as actividades de ASGM que são praticadas neste região/distrito que conhece?
B4	Na sua unidade sanitária você pergunta sobre, relata ou registra casos de doenças ocupacionais ou história de acidentes? Por outras palavras, sabe diferenciar se um paciente é mineiro ou não?
	<input type="checkbox"/> Se sim, registra esses casos em algum sítio?
C. Questões de saúde gerais	
C1	Quais são as doenças e condições mais comuns nas comunidades da região ou distrito? [para todas as idades]
	<input type="checkbox"/> Para pacientes internados e em ambulatório?
C2	Quais são as doenças e condições mais comuns nas comunidades da região ou distrito? [adultos]
	<input type="checkbox"/> Para pacientes internados e em ambulatório?
C3	Quais são os acidentes e lesões mais comuns nas comunidades da região ou distrito?

C4	Na sua opinião, quais são os grupos marginalizados, negligenciados e estigmatizados na comunidade no que se refere a saúde e ao acesso aos cuidados de saúde?
D. Estado de alerta para questões de saúde relacionadas a ASGM	
D1	Na sua opinião, quais são os maiores riscos para a saúde para a população em geral (comunidade)?
D2	Na sua opinião, quais são os riscos da ASGM em particular? <i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i>
D3	De acordo com o seu conhecimento, pensa que os mineiros artesanais de ouro e de pequena escala protegem-se contra os riscos para a saúde?
	<ul style="list-style-type: none"> ■ Se sim, como é que eles se protegem? ■ Se não, porque é que não se protegem?
D4	Na sua opinião, quais são os riscos de uma maneira geral para a saúde da população (comunidades) em resultado da ASGM.
	<i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i>
E. Procura de cuidados de saúde	
E1	Na sua opinião, os membros da comunidade sempre procuram por cuidados médicos ou tratamento quando está indicado?
	<ul style="list-style-type: none"> ■ Se não, quais são os factores que determinam a procura ou não de cuidados médicos ou tratamento? ■ Se não, o que mais eles fazem?
E2	Na sua opinião, os mineiros artesanais de ouro e em pequena escala procuram cuidados médicos ou tratamento quando indicado?
	<ul style="list-style-type: none"> ■ Se não, porque não? Quais são os factores que determinam a procura ou não de cuidados médicos e tratamento? ■ Se não, o que mais eles fazem?
E3	Quais são os problemas de saúde mais comuns aos quais os mineiros artesanais de ouro e de pequena escala procuram cuidados de saúde nesta unidade sanitária?
F. Informação sobre promoção de saúde	
F1	Quem é que fornece a informação sobre a prevenção em saúde:
	<ul style="list-style-type: none"> ■ para a população em geral (comunidade)? ■ para as comunidades ASGM em particular?
F2	Onde é que a informação sobre a prevenção em saúde é dada? (exemplo mídia, na unidade sanitária, líderes, etc)
F3	Em que formato é que a informação sobre a prevenção em saúde é dada? (rádio, campanhas de massa, panfletos, brochuras?)
F4	Quais são os tópicos abordados na informação de prevenção em saúde dada?
G. Sistema de saúde e apoio institucional	
G1	Onde é que vê a necessidade urgente de actuação para abordar os mineiros artesanais de ouro e de pequena escala na comunidade em geral?
G2	O que é que os próprios mineiros artesanais de ouro e de pequena escala e os membros da comunidade podem fazer para melhorar as questões de saúde relacionadas com ASGM?

G3	Em termos de questões de saúde relacionadas a ASGM, o que já foi feito no passado, o vem sendo feito e o que se planifica fazer no futuro a nível nacional e local para abordar estas questões? (exemplo: educação para a saúde, intervenções)
	<ul style="list-style-type: none"> ■ Nas comunidades
	<ul style="list-style-type: none"> ■ Na sua unidade sanitária
H. Avaliação da Unidade Sanitária: capacidades e estado de prontidão	
H1	Sente que você e os outros profissionais de saúde desta unidade sanitária estão familiarizados e suficientemente treinados para responder as questões de saúde relacionadas com ASGM?
H2	Pensa que a sua unidade sanitária está suficientemente equipada para responder as questões de saúde relacionadas com ASGM?
H3	<i>Continuar no instrumento separado para a Avaliação da Unidade Sanitária (inventário)</i>
I. Fim da entrevista e da avaliação a unidade sanitária	
I1	Tem alguma questão que queira fazer?
I2	Obrigada pela sua participação.
I3	Coordenadas de GPS
I4	Hora do fim da entrevista
J. Observações do Entrevistador	
J1	Outras observações/anotações do entrevistador:

KII Questionnaire – Traditional Community Leader

A. Informações gerais	
A1	Data da entrevista:
A2	Tipo de informante:
A3	Comunidade/Vila/Bairro/Local de estudo:
A4	Nome do entrevistado:
A5	Informação adicional sobre a função do entrevistado:
A6	Hora de início da entrevista:
A7	Nome do entrevistador:
B. Informação básica	
B1	Há quanto tempo vive/trabalha nesta comunidade/vila/bairro/local de estudo?
B2	Sabe dizer desde quando as actividades de ASGM são praticadas nesta comunidade/vila/bairro/local de estudo?
B3	Quais são as implicações ambientais da ASGM na sua comunidade?

B4	Quais são as implicações sociais da ASGM na sua comunidade?
B5	Quais são as implicações económicas da ASGM na sua comunidade?
B6	Para quantas casas/agregados na sua comunidade a ASGM é a fonte primária de rendimento?
C. Sistema de Saúde e procura de cuidados de saúde	
C1	Na sua opinião, quais são os mais comuns problemas de saúde na sua comunidade?
	■ Todas idades
	■ Homens e Mulheres
	■ Crianças, adultos jovens e adultos mais velhos
	■ Mineiros artesanais de ouro e de pequena escala
C2	Para o caso destes problemas de saúde, os membros da comunidade procuram os cuidados de saúde e tratamento?
	■ Se não, porque não?
	■ Se sim, onde? Porque é que vão para lá?
C3	Os membros da comunidade encontram obstáculos/barreiras para obterem os serviços de saúde para estes problemas de saúde?
	■ Se sim, que tipo de obstáculos e porquê?
C4	Se eles se deslocam a unidade sanitária, eles recebem os serviços adequados para esses problemas de saúde?
	■ Se não, porque não?
C5	Quais são os acidentes e lesões mais comuns na sua comunidade?
C6	Na sua opinião, quais são actualmente os maiores riscos para a saúde para os membros da comunidade ASGM que vivem em áreas ASGM mas que não estão directamente envolvidas em actividades de mineração?
	<i>Possíveis respostas:</i>
	Malária
	Distúrbios mentais
	Condições de vida
	Barulho
	Malnutrição
	Vibração
	Cansaço
	Nenhum
	Abuso de consumo de substâncias
	Poeiras
	Calor e humidade
	Doenças sexualmente transmitidas
	Ficar doentes pelo contacto com químicos
	Problemas biomecânicos
Outros, especifique:	

	Na sua opinião, quais são os maiores riscos de saúde para os mineiros artesanais de ouro e de pequena escala enquanto estão a trabalhar?
	<i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i>
	<i>Possíveis respostas:</i>
	Ficar soterrado no subsolo
	Exaustão
	Queda em um buraco
	Contrair Malária
	Barulho
	Vibração
C7	Radiação
	Exposto a Poeiras
	Malnutrição
	Exposto a calor e humidade
	Cansaço extremo
	Nenhum
	Exposto a baixos níveis de O2
	Explosivos
	Ficar doente pelo contacto com químicos
	Outros, especifique:
C8	Na sua opinião, quais são os grupos marginalizados, negligenciados e estigmatizados na comunidade no que se refere a saúde e ao acesso aos cuidados de saúde?
C9	O que os próprios mineiros e os membros da comunidade podem fazer para melhorar as suas questões de saúde relacionadas com a ASGM?
D. Fim da entrevista	
D1	Tem alguma questão que queira fazer?
D2	Obrigada pela sua participação.
D3	Coordenadas de GPS
D4	Hora do fim da entrevista
E. Observações do Entrevistador	
E1	Outras observações/anotações do entrevistador:

KII Questionnaire – ASGM community leader

A. Informações gerais	
A1	Data da entrevista:
A2	Tipo de informante:
A3	Comunidade/Vila/Bairro/Local de estudo:
A4	Código do entrevistado:
A5	Informação adicional sobre a função do entrevistado:
A6	Hora de início da entrevista:
A7	Nome do entrevistador:
B. Informação básica	
B1	Há quanto tempo vive/trabalha nesta comunidade/vila/bairro/local de estudo?
B2	Sabe dizer desde quando as actividades de ASGM são praticadas nesta comunidade/vila/bairro/local de estudo?
B3	Quais são as implicações ambientais da ASGM na sua comunidade?
B4	Quais são as implicações sociais da ASGM na sua comunidade?
B5	Quais são as implicações económicas da ASGM na sua comunidade?
C. Sistema de Saúde e procura de cuidados de saúde	
C1	Na sua opinião, quais são os mais comuns problemas de saúde na sua comunidade?
	■ Todas idades
	■ Homens e Mulheres
	■ Crianças, adultos jovens e adultos mais velhos
C2	■ Mineiros artesanais de ouro e de pequena escala
	Para o caso destes problemas de saúde, os membros da comunidade procuram os cuidados de saúde e tratamento?
	■ Se não, porque não?
C3	■ Se sim, onde? Porque é que vão para lá?
	Os membros da comunidade encontram obstáculos/barreiras para obterem os serviços de saúde para estes problemas de saúde?
C4	■ Se sim, que tipo de obstáculos e porquê?
	Se eles se deslocam a unidade sanitária, eles recebem os serviços adequados para esses problemas de saúde?
C5	■ Se não, porque não?
	Quais são os acidentes e lesões mais comuns na sua comunidade?

C6	Na sua opinião, quais são os maiores riscos de saúde para os mineiros artesanais de ouro e de pequena escala enquanto estão a trabalhar?
	<i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i>
	<i>Possíveis respostas:</i>
	Exaustão
	Ficar soterrado no subsolo
	Queda em um buraco
	Contrair Malária
	Exposto a Poeiras
	Barulho
	Vibração
	Radiação
	Cansaço extremo
	Malnutrição
	Exposto a calor e humidade
	Exposto a baixos níveis de O2
	Nenhum
	Explosivos
Ficar doente pelo contacto com químicos	
Outros, especifique:	
C7	Na sua opinião, quais são actualmente os maiores riscos para a saúde para os membros da comunidade ASGM que vivem em áreas ASGM mas que não estão directamente envolvidas em actividades de mineração?
	<i>Se aplicável</i>
	<i>Possíveis respostas:</i>
	Condições de vida
	Barulho
	Malária
	Distúrbios mentais
	Abuso de consumo de substâncias
	Poeiras
	Malnutrição
	Vibração
	Cansaço
	Nenhum
	Calor e humidade
	Doenças sexualmente transmitidas
	Ficar doentes pelo contacto com químicos
	Problemas biomecânicos
Outros, especifique:	

C8	Na sua opinião, quais são os grupos marginalizados, negligenciados e estigmatizados na comunidade no que se refere a saúde e ao acesso aos cuidados de saúde?
C9	O que os próprios mineiros e os membros da comunidade podem fazer para melhorar as suas questões de saúde relacionadas com a ASGM?
D. Fim da entrevista	
D1	Tem alguma questão que queira fazer?
D2	Obrigada pela sua participação.
D3	Coordenadas de GPS
D4	Hora do fim da entrevista
E. Observações do entrevistador	
E1	Outras observações/anotações do entrevistador:

KII Questionnaire – Civil society organization representative

A. Informações gerais	
A1	Local e data:
A2	Tipo de informante:
A3	Código do entrevistado:
A4	Posição/Função do entrevistado:
A5	Hora de início da entrevista:
A6	Nome do entrevistador:
B. Informação básica	
B1	Há quanto tempo trabalha nesta região/distrito?
B2	Desde quando a sua organização está activa nesta região/distrito?
B3	Sabe dizer desde quando é que se pratica mineração artesanal de ouro em pequena escala (ASGM) nesta região/distrito?
B4	Quais são as actividades de ASGM que são praticadas neste região/distrito que conhece?
C. Estado de alerta/consciência	
C1	Na sua opinião, quais são os maiores riscos para a saúde para a população em geral (comunidade)?
	<i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i>
C2	Na sua opinião, quais são os riscos da ASGM em particular? <i>Sondar sobre a exposição a mercúrio e cianetos, se não mencionadas espontaneamente.</i>

C3	Na sua opinião, quais são os riscos ambientais causados pelas actividades de ASGM?
	<ul style="list-style-type: none"> ■ Como é que estes riscos ambientais influenciam a saúde humana?
C4	Na sua opinião, quais são os grupos negligenciados, marginalizados e estigmatizados na comunidade?
	<ul style="list-style-type: none"> ■ Especialmente em termos de saúde e acesso aos cuidados de saúde?
	<i>Sondar sobre os mineiros artesanais de ouro e em pequena escala.</i>
D. Capacidades do Sistema de Saúde	
D1	Na sua opinião, o sistema de saúde no seu estágio actual é capaz de responder as questões de saúde relacionadas com ASGM?
D2	O que podem fazer os próprios mineiros artesanais de ouro de pequena escala e os membros da comunidade para melhorar as questões de saúde relacionadas com a ASGM?
D3	Na sua opinião, quais são os sectores/organizações que devem trabalhar em colaboração para abordar as questões de saúde relacionadas com a ASGM?
	<ul style="list-style-type: none"> ■ Esta colaboração inter-sectorial está a acontecer actualmente?
	<ul style="list-style-type: none"> ■ Se sim, como é feita a colaboração e quais são os intervenientes?
	<ul style="list-style-type: none"> ■ Se não, porque não?
E. Actividades organizacionais?	
E1	Em termos de questões de saúde relacionadas a ASGM, quais são as actividades que a sua organização já fez no passado, tem feito actualmente e quais os planos para o futuro?
	<ul style="list-style-type: none"> ■ Quais os tópicos, frequência, parceiros, grupos-alvo, impactos, etc.
E2	Está especificamente a abordar o uso de mercúrio?
F. Fim da entrevista	
F1	Tem alguma questão que queira fazer?
F2	Obrigada pela sua participação.
F3	Coordenadas de GPS
F4	Hora do fim da entrevista
G. Observações do Entrevistador	
G1	Outras observações/anotações do entrevistador:

FGD semi-structured questionnaire – Artisanal and small-scale gold miners

A. Informação geral	
A1	Data da DGF:
A2	Tipo de grupo:
A3	Número de participantes (m:f):
A4	Amplitude de idades dos participantes:
A5	Nome da comunidade:
A6	Hora de início da entrevista:
A7	Nome do entrevistador:
B. Informação sócio-demográfica e económica:	
B1	Quantos de vocês nasceram nesta região/distrito?
B2	Quantos de vocês não são de nacionalidade moçambicana?
B3	Quantos de vocês vivem aqui há mais de 5 anos?
B4	Quantos de vocês estão aqui com família?
B5	Quantos de vocês completaram o ensino primário?
B6	Quantos de vocês trabalham na mina o ano inteiro?
B7	Quantos de vocês é que trabalham sazonalmente na mina?
B8	Para quantos de vocês a mina é a fonte primária de rendimento?
B9	Quantos de vocês estão empregados ou fazem parte da associação de ASGM?
B10	Quais são as principais actividades que realiza enquanto trabalha na mina?
C. Questões de saúde gerais e procura de cuidados de saúde	
C1	Na sua opinião, quais são actualmente os principais problemas de saúde?
C2	No caso destes problemas de saúde, procura cuidados médicos ou tratamento?
	<ul style="list-style-type: none"> ■ Se não, porque não? ■ Se sim, onde? Porque é que para lá vai?
C3	Alguma vez você e a sua família enfrentaram obstáculos/barreiras para obter serviços de saúde para esses problemas de saúde?
	<ul style="list-style-type: none"> ■ Se sim, que tipo de obstáculos e porquê?
C4	Qual é o nível esforço financeiro para obter cuidados de saúde na unidade sanitária, isto é custos de transporte, serviços e tratamento?
C5	Se for a unidade sanitária, terá confiança de que obterá os serviços de saúde necessários de acordo com estes problemas de saúde?
	<ul style="list-style-type: none"> ■ Se não, porque não?

D. Questões de saúde específicas relacionadas a ASGM e procura de cuidados de saúde	
D1	Na sua opinião, qual é actualmente o principal problema de saúde relacionado a ASGM?
D2	No caso deste problema de saúde, procura cuidados médicos e tratamento?
	<ul style="list-style-type: none"> ■ Se não, porque não? ■ Se sim, onde? Porque é que vai para lá?
D3	Alguma vez encontrou obstáculos/barreiras para obter serviços de cuidados de saúde para este problema de saúde?
	<ul style="list-style-type: none"> ■ Se sim, que tipo de obstáculos e porquê?
D4	Alguma vez encontrou obstáculos/barreiras para obter serviços de cuidados de saúde enquanto trabalhava na mina (ASGM)?
	<ul style="list-style-type: none"> ■ Se sim, que tipo de obstáculos e porquê?
D5	Qual é o nível esforço financeiro para obter cuidados de saúde na unidade sanitária, isto é custos de transporte, serviços e tratamento?
D6	Se se deslocar a unidade sanitária, terá confiança de que obterá os serviços de saúde necessários de acordo com estes problemas de saúde?
	<ul style="list-style-type: none"> ■ Se não, porque não?
D7	O que faz quando tem dor em algum lugar do seu corpo?
	<ul style="list-style-type: none"> ■ Quais são os factores que determinam o seu comportamento?
D8	Quais são os acidentes ou lesões mais comuns enquanto trabalha na mina?
	<ul style="list-style-type: none"> ■ Se sim, qual é o acidente mais comum?
D9	O que faz quando acontece um acidente ou lesão?
	<ul style="list-style-type: none"> ■ Quais são os factores que determinam o seu comportamento?
E. Percepções de riscos para a saúde e comportamentos no processo de trabalho na ASGM	
E1	Na sua opinião, qual é o maior risco para a sua saúde enquanto trabalha na mina?
	<i>Possíveis respostas:</i>
	Ficar soterrado no subsolo
	Exaustão
	Queda em um buraco
	Contrair Malária
	Barulho
	Radiação
	Vibração
	Cansaço extremo
	Exposto a Poeiras
	Malnutrição
	Exposto a calor e humidade
	Exposto a baixos níveis de O2
	Explosivos
	Nenhum
	Ficar doente pelo contacto com químicos
Outros, especifique:	

E2	Quando trabalha na mina, há algo que lhe protege destes riscos?
	■ Se sim, como se protege? Porque é que se protege?
	<i>Possíveis respostas:</i>
	Respirador
	Luvas
	Mangas cumpridas
	Botas
	Óculos protectores
	Outros, especifique:
	■ Se não, porque não?
F. Actividades de promoção de saúde	
F1	Onde é que obtém informação sobre promoção em saúde? (exemplo mídia, sector de saúde, líderes, etc.)
F2	Em que formato é que obtém a informação sobre a promoção de saúde (exemplo rádio, campanhas de massa, panfletos, brochuras? (por quem), etc
F3	Quem é que fornece a informação sobre a prevenção em saúde? (exemplo. ONG's, provedores de cuidados de saúde, sector privado, governo)
F4	Sobre quais tópicos é que já obteve informação sobre promoção de saúde na sua comunidade?
	■ Já alguma vez recebeu informação sobre promoção em saúde sobre questões de saúde relacionadas a ASGM?
F5	A informação sobre a promoção em saúde que recebeu foi útil para si?
	■ Se não, o que poderia ser útil?
G. Fim da DGF	
G1	Como é que o sector de saúde pode melhor abordar as suas necessidades de saúde?
G2	Tem alguma questão que queira fazer?
G3	Obrigada pela sua participação.
G4	Coordenadas de GPS
G5	Hora do fim da DGF
H. Observações dos entrevistadores	
H1	Outras observações/anotações do entrevistador:
H2	Outras observações/anotações do profissional de saúde da comunidade:

FGD semi-structured questionnaire – Family members of artisanal and small-scale gold miners

A. Informação geral	
A1	Data da DGF:
A2	Tipo de grupo:
A3	Número de participantes (m:f):
A4	Amplitude de idades dos participantes:
A5	Nome da comunidade:
A6	Hora de início da entrevista:
A7	Nome do entrevistador:
B. Informação sócio-demográfica e económica:	
B1	Quantos de vocês nasceram nesta região/distrito?
B2	Quantos de vocês não são de nacionalidade moçambicana?
B3	Quantos de vocês vivem aqui há mais de 5 anos?
B4	Quantos de vocês estão aqui com família?
B5	Quantos de vocês tem filhos aqui?
B6	Quantos de vocês completaram o ensino primário?
B7	Para quantos de vocês a mina é a fonte primária de rendimento?
B8	Quais são as principais actividades que realiza enquanto trabalha na mina?
C. Questões de saúde gerais e procura de cuidados de saúde	
C1	Na sua opinião, quais são actualmente os principais problemas de saúde?
C2	No caso destes problemas de saúde, procura cuidados médicos ou tratamento?
	<ul style="list-style-type: none"> ■ Se não, porque não? ■ Se sim, onde? Porque é que para lá vai?
C3	Alguma vez você e a sua família enfrentaram obstáculos/barreiras para obter serviços de saúde para esses problemas de saúde?
	<ul style="list-style-type: none"> ■ ? Se sim, que tipo de obstáculos e porquê?
C4	Qual é o nível esforço financeiro para obter cuidados de saúde na unidade sanitária, isto é custos de transporte, serviços e tratamento?

C5	Se for a unidade sanitária, terá confiança de que obterá os serviços de saúde necessários de acordo com estes problemas de saúde?
	<ul style="list-style-type: none"> ■ Se não, porque não?
C6	Os acidentes e lesões são comuns na sua comunidade?
	<ul style="list-style-type: none"> ■ Se sim, quais são os acidentes mais comuns?
C7	O que faz num evento como um acidente ou lesão?
	<ul style="list-style-type: none"> ■ Quais são os factores que determinam este comportamento de sua parte?
D. Percepções de riscos para a saúde e comportamentos no processo de trabalho na ASGM	
D1	Na sua opinião, pensa que está exposto a algum risco para a sua saúde causado pelas actividades ASGM (na mina) que ocorrem na sua comunidade?
	<ul style="list-style-type: none"> ■ Se sim, quais são esses riscos em particular? ■ Se sim, como se protege destes riscos para a sua saúde?
D2	No caso destes riscos para a saúde lhe causarem problemas de saúde, procura cuidados médicos ou tratamento?
	<ul style="list-style-type: none"> ■ Se não, porque não? ■ Se sim, onde? Porque é que para lá vai?
D3	Se for a unidade sanitária, terá confiança de que obterá os serviços de saúde necessários de acordo com estes problemas de saúde?
	<ul style="list-style-type: none"> ■ Se não, porque não?
E. Actividades de promoção de saúde	
E1	Onde é que obtém informação sobre promoção em saúde? (exemplo mídia, sector de saúde, líderes, etc.)
E2	Em que formato é que obtém a informação sobre a promoção de saúde (exemplo rádio, campanhas de massa, panfletos, brochuras? (por quem), etc
E3	Quem é que fornece a informação sobre a prevenção em saúde? (exemplo. ONG's, provedores de cuidados de saúde, sector privado, governo)
E4	Sobre quais tópicos é que já obteve informação sobre promoção de saúde na sua comunidade?
	<ul style="list-style-type: none"> ■ Já alguma vez recebeu informação sobre promoção em saúde sobre questões de saúde relacionadas a ASGM?
E5	A informação sobre a promoção em saúde que recebeu foi útil para si?
	<ul style="list-style-type: none"> ■ Se não, o que poderia ser útil?
F. Fim da DGF	
F1	Como é que o sector de saúde pode melhor abordar as suas necessidades de saúde?
F2	Tem alguma questão que queira fazer?
F3	Obrigada pela sua participação.
F4	Coordenadas de GPS
F5	Hora do fim da DGF
G. Observações dos entrevistadores	
G1	Outras observações/anotações do entrevistador:
G2	Outras observações/anotações do profissional de saúde da comunidade:

FGD semi-structured questionnaire – ASGM community members (non-mining)

A. Informação geral	
A1	Data da DGF:
A2	Tipo de grupo:
A3	Número de participantes (m:f):
A4	Amplitude de idades dos participantes:
A5	Nome da comunidade:
A6	Hora de início da entrevista:
A7	Nome do entrevistador:
B. Informação sócio-demográfica e económica:	
B1	Quantos de vocês nasceram nesta região/distrito?
B2	Quantos de vocês não são de nacionalidade moçambicana?
B3	Quantos de vocês vivem aqui há mais de 5 anos?
B4	Quantos de vocês estão aqui com família?
B5	Quantos de vocês tem filhos aqui?
B6	Quantos de vocês completaram o ensino primário?
B7	Para quantos de vocês a mina é a fonte primária de rendimento?
B8	Quais são as principais actividades que realiza enquanto trabalha na mina?
C. Questões de saúde gerais e procura de cuidados de saúde	
C1	Na sua opinião, quais são actualmente os principais problemas de saúde?
C2	No caso destes problemas de saúde, procura cuidados médicos ou tratamento?
	<ul style="list-style-type: none"> ■ Se não, porque não? ■ Se sim, onde? Porque é que para lá vai?
C3	Alguma vez você e a sua família enfrentaram obstáculos/barreiras para obter serviços de saúde para esses problemas de saúde?
	<ul style="list-style-type: none"> ■ Se sim, que tipo de obstáculos e porquê?
C4	Qual é o nível esforço financeiro para obter cuidados de saúde na unidade sanitária, isto é custos de transporte, serviços e tratamento?

C5	Se se deslocar a unidade sanitária, terá confiança de que obterá os serviços de saúde necessários de acordo com estes problemas de saúde?
	<ul style="list-style-type: none"> ■ Se não, porque não?
C6	Os acidentes e lesões são comuns na sua comunidade?
	<ul style="list-style-type: none"> ■ Se sim, quais são os acidentes mais comuns?
C7	O que faz num evento como um acidente ou lesão?
	<ul style="list-style-type: none"> ■ Quais são os factores que determinam este comportamento de sua parte?
D. Percepções de riscos para a saúde e comportamentos no processo de trabalho na ASGM	
D1	Na sua opinião, pensa que está exposto a algum risco para a sua saúde causado pelas actividades ASGM (na mina) que ocorrem na sua comunidade?
	<ul style="list-style-type: none"> ■ Se sim, quais são esses riscos em particular? ■ Se sim, como se protegé destes riscos para a sua saúde?
D2	No caso destes riscos para a saúde lhe causarem problemas de saúde, procura cuidados médicos ou tratamento?
	<ul style="list-style-type: none"> ■ Se não, porque não? ■ Se sim, onde? Porque é que para lá vai?
D3	Se for a unidade sanitária, terá confiança de que obterá os serviços de saúde necessários de acordo com estes problemas de saúde?
	<ul style="list-style-type: none"> ■ Se não, porque não?
E. Actividades de promoção de saúde	
E1	Onde é que obtém informação sobre promoção em saúde? (exemplo mídia, sector de saúde, líderes, etc.)
E2	Em que formato é que obtém a informação sobre a promoção de saúde (exemplo rádio, campanhas de massa, panfletos, brochuras? (por quem), etc
E3	Quem é que fornece a informação sobre a prevenção em saúde? (exemplo. ONG's, provedores de cuidados de saúde, sector privado, governo)
E4	Sobre quais tópicos é que já obteve informação sobre promoção de saúde na sua comunidade?
	<ul style="list-style-type: none"> ■ Já alguma vez recebeu informação sobre promoção em saúde sobre questões de saúde relacionadas a ASGM?
E5	A informação sobre a promoção em saúde que recebeu foi útil para si?
	<ul style="list-style-type: none"> ■ Se não, o que poderia ser útil?
F. Fim da DGF	
F1	Como é que o sector de saúde pode melhor abordar as suas necessidades de saúde?
F2	Tem alguma questão que queira fazer?
F3	Obrigada pela sua participação.
F4	Coordenadas de GPS
F5	Hora do fim da DGF
G. Observações dos entrevistadores	
G1	Outras observações/anotações do entrevistador:
G2	Outras observações/anotações do profissional de saúde da comunidade:

Observational tool – ASGM site

Data da visita ao local de estudo (mina)	
Nome, localização do local de estudo (mina)	
Coordenadas de GPS do local de estudo (mina)	
Tamanho aproximado da população no local do estudo (mina)	
Tipos de minas de ouro	<input type="checkbox"/> Rocha <input type="checkbox"/> Aluvial (sedimentos no rio) <input type="checkbox"/> Outro, especifique:
Natureza e escala da mina de ouro (exemplo se é rudimentar, ou se usa algum equipamento em etapas específicas do processo)	
Natureza das actividades na mina de ouro	<input type="checkbox"/> Anual, por todo ano <input type="checkbox"/> Sazonal: _____ <input type="checkbox"/> Outro, especifique:
Estrutura organizacional do local de estudo (mina)	<input type="checkbox"/> Nenhuma <input type="checkbox"/> Organizada, especifique: <input type="checkbox"/> Não sei
Dados demográficos dos mineiros	<input type="checkbox"/> Homens <input type="checkbox"/> Mulheres <input type="checkbox"/> Crianças
Informação sobre as vias de migração (se alguma)	Extensão da migração interna Origem dos migrantes Sazonalidade da migração, se aplicável
Onde é que os diferentes processos do trabalho ocorre? <i>Esboce a área ou narre.</i>	
Tipos de actividades observadas	<input type="checkbox"/> Extração <input type="checkbox"/> Tunéis <input type="checkbox"/> Pancadas <input type="checkbox"/> Dragagem <input type="checkbox"/> Quedas <input type="checkbox"/> Moagem/trituração <input type="checkbox"/> Comportas <input type="checkbox"/> Centrifugação <input type="checkbox"/> Mesas vibrantes <input type="checkbox"/> Concentração gravitacional <input type="checkbox"/> Amalgamento inteiro do minério <input type="checkbox"/> Amalgamento concentrado <input type="checkbox"/> Queima de mercúrio ao ar livre <input type="checkbox"/> Queima protegida de mercúrio (exemplo uso de rutores) <input type="checkbox"/> Refinação <input type="checkbox"/> Opção <input type="checkbox"/> Opção <input type="checkbox"/> Opção

ANNEXES

Riscos físicos observados	<input type="checkbox"/> Instrumentos barulhentos <input type="checkbox"/> Pancadas <input type="checkbox"/> Processamento do minério <input type="checkbox"/> Espaços confinados <input type="checkbox"/> Contactos com explosivos <input type="checkbox"/> Contacto com equipamento electrónico defeituoso <input type="checkbox"/> Poeira <input type="checkbox"/> Queima de lixo <input type="checkbox"/> Exposição a luz solar (UV) <input type="checkbox"/> Outro, especifique:	<input type="checkbox"/> Golpes <input type="checkbox"/> Quedas <input type="checkbox"/> Minas subterrâneas <input type="checkbox"/> Contactos com fios activos <input type="checkbox"/> Poluição do ar (queima de combustíveis) <input type="checkbox"/> Opção <input type="checkbox"/> Vibração
Riscos mecânicos observados	<input type="checkbox"/> Levantamento de cargas <input type="checkbox"/> Trabalho com recurso a materiais não mecanizados <input type="checkbox"/> Trabalho repetitivo <input type="checkbox"/> Uso de equipamento pesado <input type="checkbox"/> Outro, especifique:	<input type="checkbox"/> Posturas incorrectas <input type="checkbox"/> Uso inapropriado de equipamento <input type="checkbox"/> Explosões
Riscos químicos observados	<input type="checkbox"/> Mercúrio elementar <input type="checkbox"/> Pesticidas <input type="checkbox"/> Outro, especifique:	<input type="checkbox"/> Cianetos <input type="checkbox"/> Monóxido de carbono
Riscos biológicos observados	<input type="checkbox"/> Vectores <input type="checkbox"/> Águas estagnadas <input type="checkbox"/> Outro, especifique:	
Riscos psicosociais observados	<input type="checkbox"/> Condições de trabalhos não seguras <input type="checkbox"/> Condições de vida caóticas <input type="checkbox"/> Condições de vida e trabalho precárias <input type="checkbox"/> Outro, especifique:	
Medidas de protecção em uso observadas	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Informação adicional		

