Artisanal and small-scale mining mapping in the Runde Rural District of Zimbabwe

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Zimbabwe Environmental Law Association (ZELA)

Colophon

Title: Artisanal and small-scale mining mapping in the Runde Rural District of Zimbabwe

Antwerp, April 2019.

Cover picture: Gold Mine in the Runde Rural District (Photo: ZELA).

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This research was commissioned and managed by the **Zimbabwe Environmental Law Association** (ZELA), a premier public interest environmental law group based in Zimbabwe. As a public interest non-governmental organization ZELA seeks to promote environmental justice, sustainable and equitable use of natural resources, democracy and good governance in the natural resources and environment sector.

This research was founded by the European Union Delegation to the Republic of Zimbabwe.

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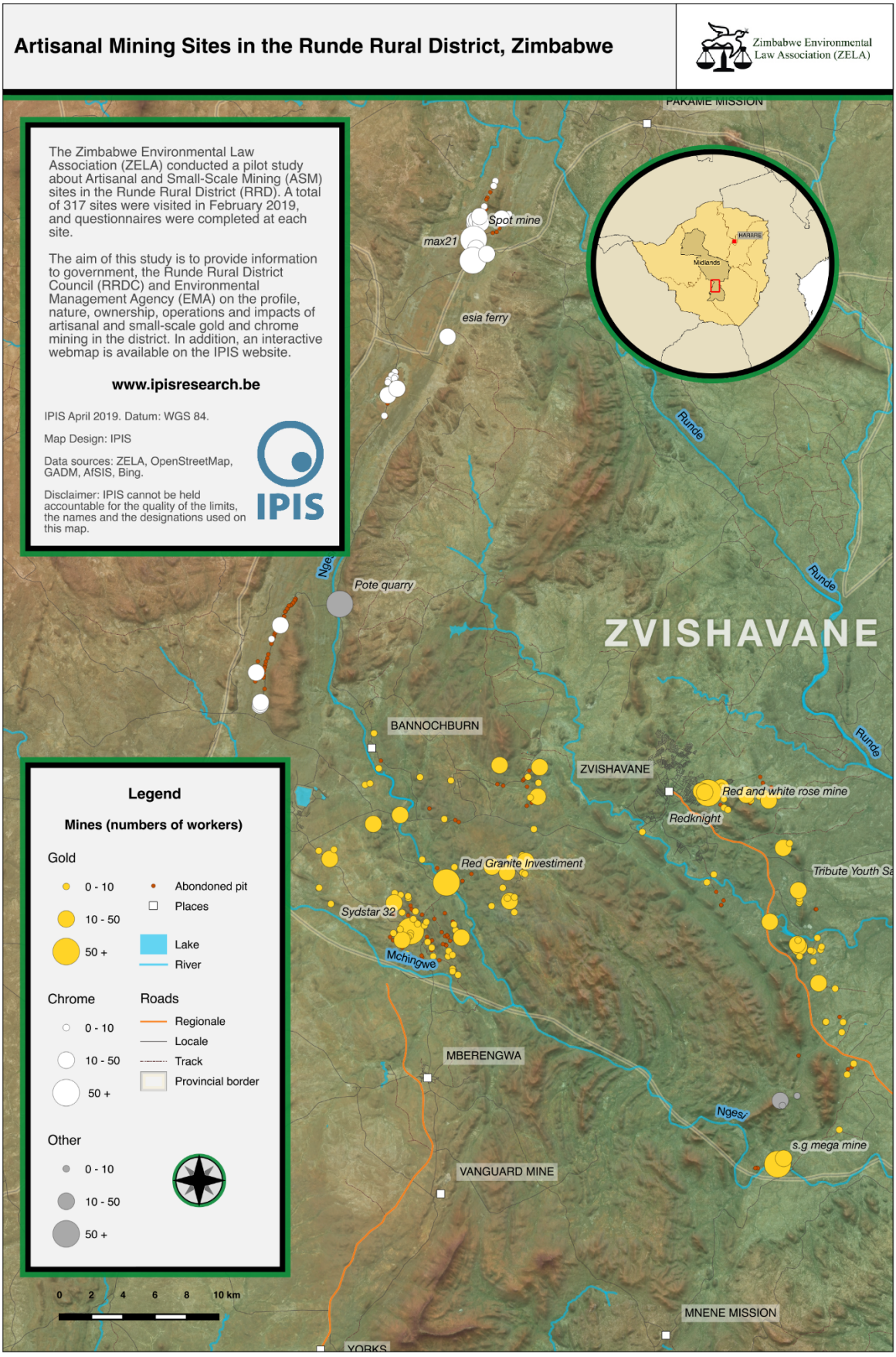
Map


Artisanal Mining Sites in the Runde Rural District, Zimbabwe
Zimbabwe Environmental Law Association (ZELA)
The Zimbabwe Environmental Law Association (ZELA) conducted a pilot study about Artisanal and Small-Scale Mining (ASM) sites in the Runde Rural District (RRD). A total of 317 sites were visited in February 2019, and questionnaires were completed at each site.
The aim of this study is to provide information to government, the Runde Rural District Council (RRDC) and Environmental Management Agency (EMA) on the profile, nature, ownership, operations and impacts of artisanal and small-scale gold and chrome mining in the district. In addition, an interactive webmap is available on the IPIS website.
www.ipisresearch.be
IPIS April 2019. Datum: WGS 84.
Map Design: IPIS
Data sources: ZELA, OpenStreetMap, GADM, AfSIS, Bing.
Disclaimer: IPIS cannot be held accountable for the quality of the limits, the names and the designations used on this map.
IPIS
Legend
Mines (numbers of workers)
Gold
0 - 10
10 - 50
50 +
Abondoned pit
Places
Lake
River
Chrome
0 - 10
10 - 50
50 +
Roads
Regionale
Locale
Track
Provincial border
Other
0 - 10
10 - 50
50 +
0 2 4 6 8 10 km
Spot mine
max21
esia ferry
Pote quarry
Runde
ZVISHAVANE
BANNOCHBURN
Red and white rose mine
Redknight
Red Granite Investiment
Sydstar 32
Mchingwe
MBERENGWA
VANGUARD MINE
s.g mega mine
MNENE MISSION
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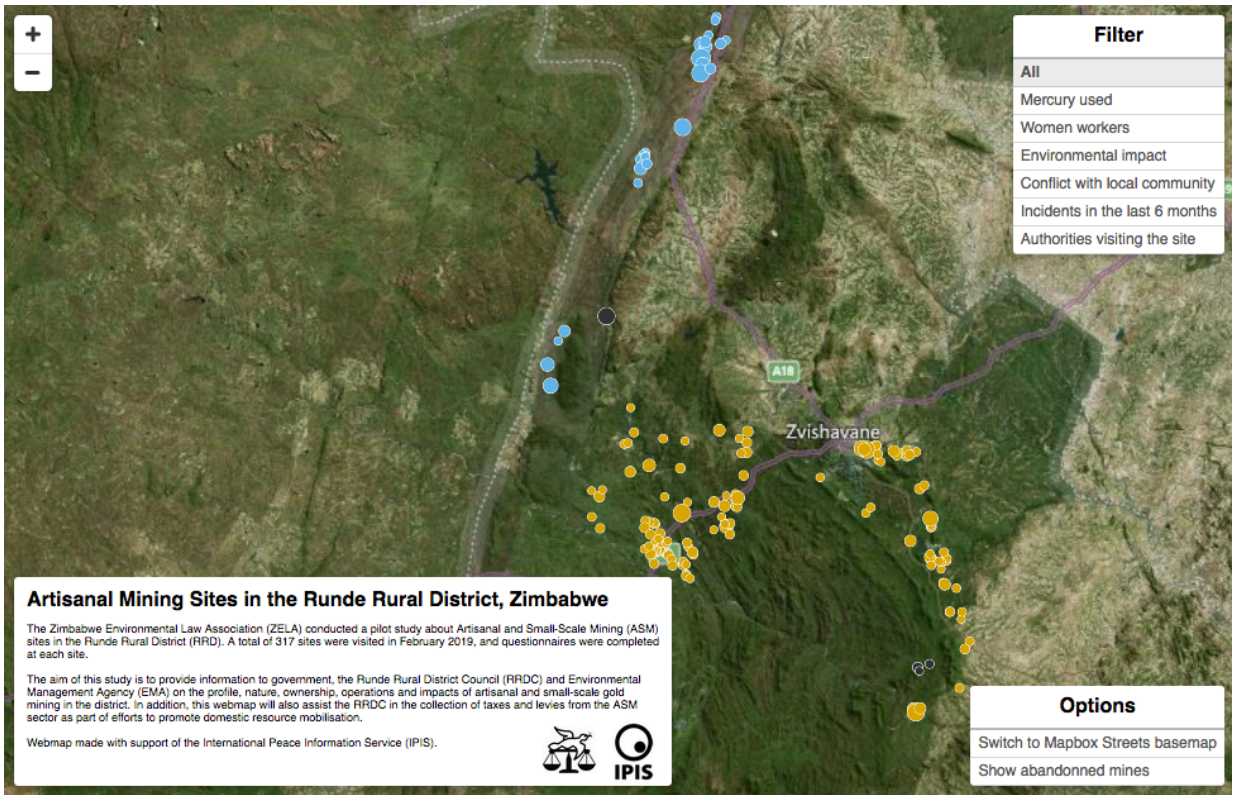
Introduction

In late February 2019, the Zimbabwe Environmental Law Association (ZELA) conducted a pilot study on Artisanal and Small-Scale Mining (ASM) in the Runde Rural District (RRD). In February 2019, five groups of enumerators from seven wards in Zvishavane visited 317 mining sites and completed questionnaires at each site.

The aim of this study is to provide an interactive map gathering information on the profile, nature, ownership, operations and impacts (including potential conflicts between farmers and miners) of artisanal and small-scale gold mining in the district. We believe that this information will help the decision making of the government, the Runde Rural District Council (RRDC) and the Environmental Management Agency (EMA).

This report was compiled by the International Peace Information Service (IPIS) commissioned to provide data analysis and visualization to ZELA, following a training on Mobile Data Collection (MDC) tools organized by IPIS in November 2018. **This report is accompanied by an interactive webmap presenting the results of the data collection. It is available at: http://www.ipisresearch.be/mapping/webmapping/zwe_mines_zela**

Picture 1: Screenshot of IPIS interactive webmap[1]



[1] Source: IPIS website available at http://www.ipisresearch.be/mapping/webmapping/zwe_mines_zela/

ZELA organized the data collection mission and managed five teams of researchers to assess the situation on mining sites in the Runde Rural District (RRD). Each identified mine was analyzed through a series of questions uploaded on a mobile phone via the OpenDataKit Collect application. Questionnaires were designed by ZELA following a training organized by IPIS.

Questions addressed the site location (using GPS coordinates), registration, status, access, number of workers (including women workers), presence of children, tools available, living conditions of workers, type of mineral, estimation of the production and price, main selling points. The questionnaire also dealt with the processing, environmental impacts, conflict, incidents, visits by local authorities and sanitary facilities, etc.

Teams of researchers were selected from the Zvishavane Mberengwa Miners Association (ZMMA), the RRDC and the Environmental Management Agency (EMA). After taking the exact geo-coordinates of the mining site, researchers interviewed the miners present to fill in the questionnaire. In order to obtain reliable data, researchers prioritized interviews with the owner of the mine, or a senior miner if (s)he was absent.

Sampling

A multi-stage sampling technique was used in this study to select ASM hotspots. In stage one, Zvishavane District, where many small-scale mining operations take place, was purposely selected given that ZELA is already working there. Stage two involved the selection of 7 wards from a total of 19 in the district. The wards selected are known for mineral panning and have a high percentage of gold claims.

I. General information on the sites

Number of sites

ZELA teams visited 317 sites in February 2019. Out of those, 173 were currently active. Most of the production (116 sites, N = 172[2]) is extracted from underground mining sites. The 56 remaining sites are open casts or alluvial exploitations. Almost all the active sites (156, N = 172) are officially registered. Registration was in process at 6 of the 16 remaining sites.

Table 1: License ownership status

Individual	Cooperative	Company	Tributary	Total
86	26	24	20	**156**

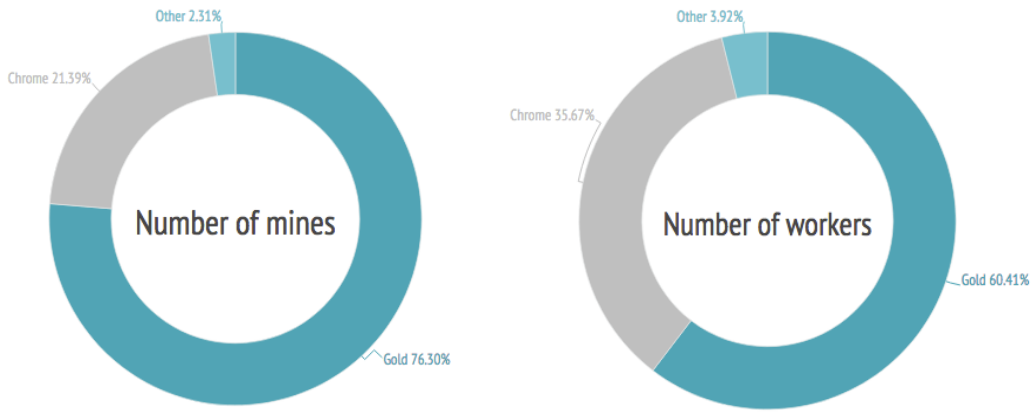
Number of workers

Most of the sites covered by this study are gold (132, N = 173) or chrome (37) mining sites. Two other sites are mining for antinomy and two others are milling sites aggregating production from surrounding sites. Miners were present on 164 sites and represented a total number of 2 349 workers. On average, there are 14 miners on a site, but the largest one had 243 workers.

Table 2: Number of workers and sites per mineral

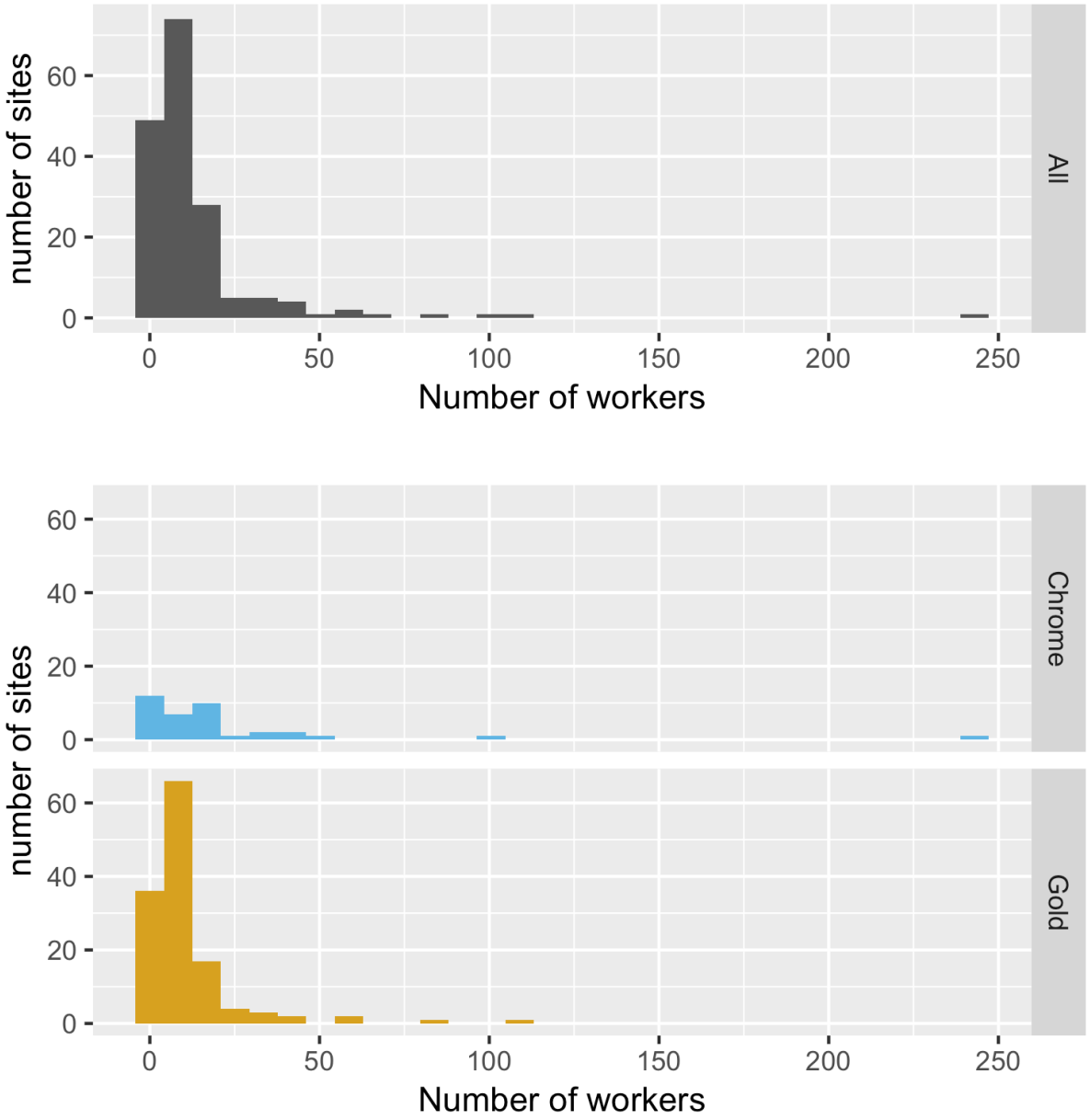
	Gold	Chrome	Combined
Workers (Total)	1 419	838	2 349
Workers (Average)	10,75	22,65	14
Sites	132	37	173

Graph 1: Percentage of workers and sites per mineral



[2] As some of the questions were not necessarily asked on all sites, especially the inactive one, we will specify the number of responses for each question.

Graph 2: Distribution of the number of workers per site



Women were present and actively engaged in the mining operations on 41 sites. In total, 143 women were working, with an average of 3 women per site and a maximum of 14. Six children under 15 were seen working on only 2 sites. In sites where women are present, there activities are diverse, from digging at the surface to washing, sluicing, panning, treating gold with mercury, transporting material, monitoring pits production or cooking. When present, children are mostly tasked to carry the ore.

II. Level of mechanization and infrastructures

Living conditions

In most cases (102, N = 173), workers live directly on the site as they are not residents of nearby villages. Workers from 72 sites live in a support village and workers from 20 sites live on a compound organized by the mining company (responses were not exclusives from one another).

Most of the mining sites have no sanitary facilities (113, N = 169). Miners prefer not to invest in infrastructure as the ASM has short lifespan. Pit latrines or flush toilets were reported only on 50 and 4 of the visited sites, respectively.

"There is no water, miners are drinking water from the pits."[3]

Equipment

Whereas miners do not invest in basic commodities, they do invest in equipment. In fact, we have observed compressors on 105 sites and jack hammers on 104 sites (N = 170). Other types of equipment were also reported: excavators (on 38 sites), hoist or winches (34), dumpers (28) and, more occasionally, metal detectors (9). Researchers noted that equipment such as excavators were shared amongst nearby miners whilst others hired the material on a contractual basis. Miners reported that they did not receive training on how to handle the various equipment and they rely on sharing the skills amongst themselves.

"Miners use detectors to search for gold after digging up loads of rubble. After they are done, pits are left open."[4]

Picture 2: Example of metal detector being used in a gold mine near the village of Machovo.

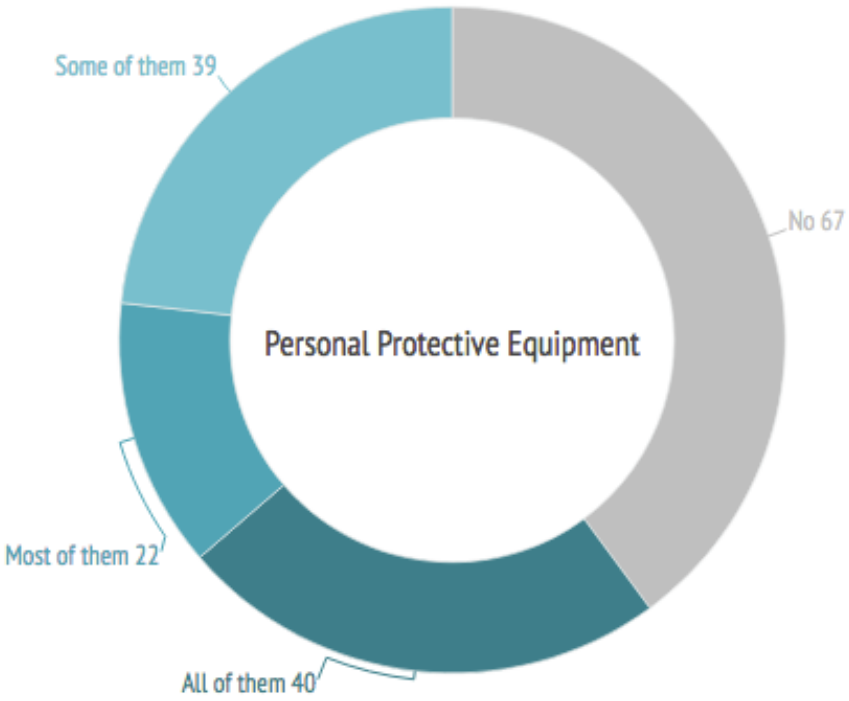
[3] Location: Site 'Y', near Kofi village.
[4] Location: Site 'Alluvial 1', near the village Amon.

Picture 3: Excavators producing about 1 200 tons of chrome ore[5]

Personal protective equipment (PPE) items were also visible on many mining sites (101, N = 168), although we counted only 40 sites where everyone is somehow protected. Interestingly, on most sites, it is the mining management that provides the PPE. Helmets, gumboots and work-suits are the most frequent equipment, spotted on respectively 92, 90 and 83 sites.

Other reported PPEs were gloves (on 55 sites), facemasks (25), safety glasses (18) and earmuffs (14). None of the women and children present was wearing protection.

Graph 3: Number of sites on which equipment were used by workers



[5] Location: 'Toddly' mine, near Torwood village.

Picture 4: "The area is well fenced, workers have protective clothing. When they started mining, they faced disputes about boundaries with other miners, and difficulties in accessing loans"[6]

Picture 5: Example of personal protective equipment being used on a gold mining site.[7]

[6] Location: 'Chabwino 5', near Murambi village, a gold mine with 6 workers.
[7] Location: 's.g mega mine', near Bedford mine.

III. Mineral production and processing

At the moment of the visit, some mining sites were active but not producing: they were still in exploration phase (9, N = 173) or temporarily vacated for financial reasons (16). Furthermore, the research was conducted during the rainy season, when some miners vacate the mines for safety reasons. Therefore, production figures might be underestimated.

Finally, as production figures are difficult to evaluate when they are based on miners and managers declarations, surveyors asked what is generally produced on a regular month.

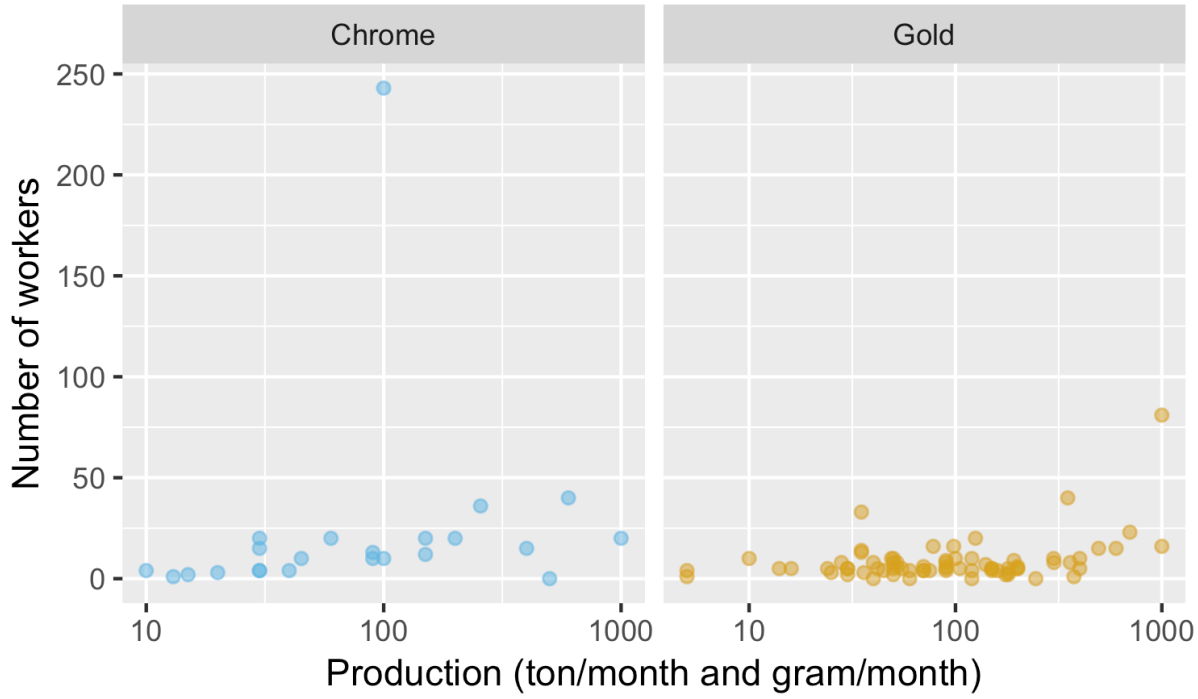
Production

Gold mining sites were producing around 90 grams (median) and 158,81 grams (average) per month, while chrome mining sites were producing around 90 tons (median) and 172,13 tons (average) per month. However, those numbers hide important disparities between sites.

Table 3: Mineral production per month

Mineral (unit)	Monthly production (Maximum)	Monthly production (Minimum)	Monthly production (Average)	Monthly production (median)	Number of sites
Gold (grams)	1000	5	158,81	90	72
Chrome (tons)	1000	10	172,13	90	23

Graph 4: Mineral production per month VS number of workers per site



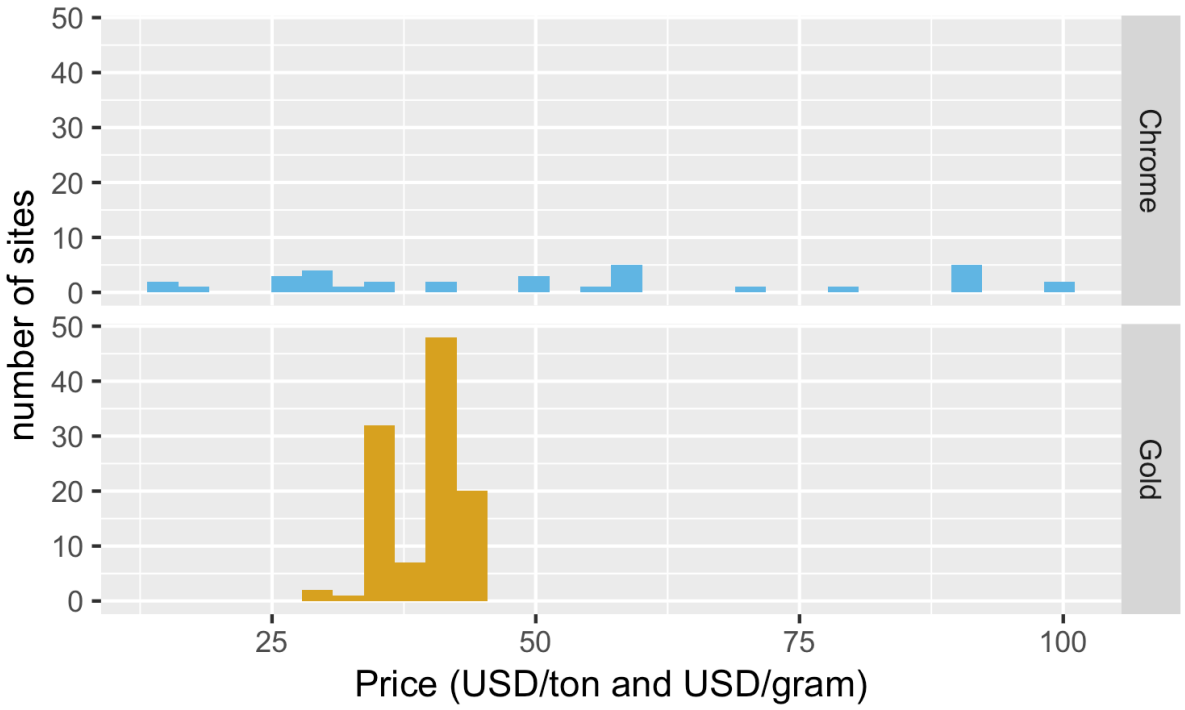
Prices

Prices may vary from one site to another. The average selling price is USD 38,85 per gram of gold and USD 52,45 per ton of chrome. Gold miners are compelled to sell their gold to Fidelity Printers and Refineries[8]. This service pays 70% cash in Forex and 30 % is transferred to the seller's account as local currency. Miners are not satisfied with that set up as local currency has lost value in recent months.

Table 4: Price per mineral

Price	Maximum	Minimum	Average	Median	Number of sites
Gold (USD/gram)	44	30	38,85	40	110
Chrome (USD/ton)	100	15	52,45	50	33

Graph 5: Distribution of price for gold and chrome



"There are no fixed prices. Miners are looking to sell to buyers with foreign currency and complain about prices they are offered."[9]

[8] https://www.newzimbabwe.com/fidelity-refiners-to-buy-gold-directly-from-artisanal-miners/
[9] Location: 'Tollwood', near Mutero village.

By multiplying the monthly production (of gold and chrome) with price per mineral and dividing it by number of workers, we can compute the value generated per each worker. However, this value generated per worker does not represent the worker's revenue. The worker salary depends on several factors such as investment in materials or equipment, taxes or license fees, unequal distribution of shares between roles in the team, etc. This would require a more in-depth analysis of the socio-economic background of the mining community, which was not the focus of this specific study.

Table 5: Value generated per worker per month

Mineral (Value)	Value generated (Maximum)	Value generated (Minimum)	Value generated (Average)	Value generated (Median)	Number of sites
Gold (USD)	13 500	40	1 055,73	629,36	64
Chrome (USD)	2 750	12,35	640,02	407,71	22

Median is usually used for discussing values or revenues because it better reflects the reality of most workers. The monthly median value generated by a gold miner is around 629,36 USD or 157,34 USD a week. On chrome mining site, miners generate a lower value around 407,71 USD a month or 101,93 USD a week. A miner usually keeps between 40 to 60% of this value, depending on his role in the production process and/or local arrangement at the mining site.

IV. Impact of mining activities

Use of mercury and cyanide

Despite their negative impact on the environment, mercury and cyanide are still being used for gold processing in artisanal and small-scale gold mining. The use of mercury was reported on 11 mining sites, and cyanide 8. However, it has to be highlighted that these substances are only used during the gold processing phase and that this process was conducted directly on the mining sites on only 26 sites.

On 112 of the gold sites (N = 121) processing was conducted on a milling point outside of the site and half of the milling point (3 out 6) visited by the surveyors were using mercury or cyanide. Therefore, there is a strong possibility that half or more of the gold production goes through milling points using mercury. Miners were not aware of specific health hazards associated with use of mercury. According to them, they have no alternative means of extracting their gold. Zimbabwe imports 50 tons of mercury while 150 tons are brought in illegally, and it is all being used by the small-scale gold miners[10].

[10] https://www.newsday.co.zw/2018/07/zims-struggles-to-eliminate-mercury/

Picture 6: Example of processing done in a gold mining site that treat 60 tons of ore per month and using both mercury and cyanide.[11]

Picture 7: Nipple milling center, near Leigh's farm, where use of cyanide was reported.

[11] Location: 'Game 4', near the village Nil.

Open pits and deforestation

Other environmental impacts were reported on most of the sites (135, N = 171). It mostly includes the presence of open pits, land degradation and deforestation. Furthermore, to fully assess the environmental impact of artisanal and small-scale mining in the area, we should also consider the impact of the non-active mining sites.

> *"There are open pits, immense deforestation"*[12]

Besides the negative environmental impact reported on these 135 mining sites, we should add 142 non-active sites where abandoned pits continue to threaten local environment and affect the local landscape. When a mine reaches its end of life, miners state that the rehabilitation process is expensive for them even if they acknowledged awareness of the Environmental Management requirements on mining site closing procedures.

Picture 8 and 9: Abandoned sites along a chrome alluvial trench.[13]

[12] Location: 'Shadreck & anold tributery', abandoned site near Village 7b.
[13] Source: IPIS website available at http://www.ipisresearch.be/mapping/webmapping/zwe_mines_zela/

Local conflicts

Conflicts with mineral exploitation were reported on 27 sites (N = 169). It usually concerns land disputes (18 sites) or relations between locals and foreigners (8 sites). Half of those conflicts opposed miners with local communities, which includes farmers or villagers, or miners themselves.

The Government of Zimbabwe is still to pass the Mines and Minerals Bill which makes effort to address the farmer-miner conflicts, though there are still gaps in the Bill[14]. Conflicts between farmers and miners arise when livestock falls in open pits and when miners invade farmers' fields without following the required procedures[15]. Conflicts between miners are usually over pit delimitation or revenue sharing at the milling point.

Incidents in the last 6 months

Incidents at the mining site over the last 6 months were reported on 13 sites (N = 170). They usually resulted in injuries or loss of property. One deadly incident was reported and was related to the use of dynamite.

Researchers noted that miners held back information related to injuries as they were scared of being reported to authorities or being further investigated. Some mining pits go as deep as 30 meters with no proper supporting structures. During the raining season, extracting ore leads to health hazard and in most instances, operations are halted.

Presence of local authorities

Most of the sites (113, N = 166) are visited by local authorities. Although these visits were reported to be at best monthly or more irregularly, they show that there is a rather good level of control of the artisanal mining sector. Visits purposes consist of collecting operating license fees, safety and health checks and mitigating complaints with environmental regulations.

> *"We face challenges from some local authority representatives. They just come to collect revenues or charge fines, yet they provide nothing for helping miners and miners have nowhere to report abuses. Government institutions should coordinate efforts in collecting operating license fees as a consolidated amount which can then be distributed amongst them. This would minimize corruption and miner abuse."*[16]

[14] https://www.newsday.co.zw/2016/01/new-act-to-resolve-mining-disputes/
[15] http://www.cite.org.zw/farmer-miner-conflicts-farmers-call-for-redress/
[16] Location: 'Greatina', near the village Gonya.

Table 6: Number of sites where local authorities were reported (Multiple authorities can visit the same mining site)

All	113 sites
CID	76 sites
EMA	71 sites
Ministry of mines	46 sites
Local authorities	45 sites
Police	35 sites
Health	8 sites
ZIMRA	7 sites
RBZ	3 sites

Conclusion

The ZELA pilot study about Artisanal and Small-Scale Mining (ASM) in the Runde Rural District (RRD) has provided an interesting insight of the mining sector. The 317 mining sites visited allow to observe trends on the gold production and environmental impact of this activity.

Despite the relatively low proportion of accidents (injuries were reported on only 7 sites, N = 170) on the mining site, most of the minerals are extracted from underground mining sites (116, N = 172), which are the most dangerous type of artisanal mining. Also, in comparison with other countries, such as DRC or CAR, a high proportion of workers wear some protection gears such as helmets. Interestingly, none of the women working (143 women were present on 41 sites) or children (six on two sites) on the mining sites wore such equipment.

If we take the number of workers to evaluate the size of the mining site, we notice that they are relatively small. In average, there are 14 miners on mining sites. The study has counted 1 419 workers spread on 132 gold mining sites and 838 on 37 chrome mining sites. As the field visit took place in the rainy season, the number of workers is likely to be a bit higher in the dry season. Despite this, some mining sites have promising production that can be explained by the use of the mechanic tools. Most of the sites are equipped with compressors (105 N = 170) and jack hammers (104 sites, N = 170). Excavators, hoist or winches as well as dumpers or metal detectors were also occasionally reported.

Production varies greatly from one mining site to another, but the average of gold production turns around 90 grams (median) and 158,81 grams (average) per month, while chrome mining sites produce around 90 tons (median) and 172,13 tons (average) per month. However, those numbers hide important disparities between sites.

The average selling price for gold is USD 38,85 per gram and USD 52,45 per ton for chrome. Median value generated weekly by a miner is estimated at USD 157,34 on gold sites and USD 101,93 on chrome sites. Depending on his role in the production process, miners usually keep between 40 to 60% of this amount.

Besides the active mining sites, enumerators have observed abandoned pits. Miners clearly do not engage in the after mining of the site. Abandoned pits are one of the main environmental impacts reported, with deforestation and mercury use. Mercury was reported only on 11 mines but was used on 3 out 6 milling points. As these milling points process the production coming from 112 sites (N = 121), it is likely that half or more of the gold production is affected by mercury use.

Local conflicts and incidents in the last six months were reported on respectively 27 and 13 sites only, but real figures may be higher as miners tend to underreport disputes and incidents in order to avoid further investigations from government authorities. The latter have a good grip on the mining sector if we count the number of sites visited by at least one agency (113, N = 166), despite the fact that visits are irregular. Finally, most active sites are officially registered (156, N = 172).

Independent research and capacity building for durable peace, sustainable development and human rights