

How much does a miner earn?

Assesment of Miner's revenue & Basic Needs study in the DRC



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EDITORIAL

How much does a miner earn?

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Antwerp, March 2020

Front cover image: Workers in Cassiterite mine in South Kivu (photo: IPIS)

Authors: Guillaume de Brier (IPIS), Angela Jorns (Levin Sources), Markus Geray and Alexandre Jaillon (IPIS)

For more information, please contact :

- Guillaume de Brier (IPIS): guillaume.debrier@ipisresearch.be or
- Angela Jorns (Levin Sources): angela.jorns@levinsources.com

Layout: SAKADO (sakado.be)

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Levin Sources is a consultancy that works to build responsible mineral supply chains and improve mineral resource governance, with a specific focus and expertise on issues surrounding artisanal and small-scale mining (ASM)

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Miners in front of their gallery in Nyankisa, North Kivu

1. EXECUTIVE SUMMARY

This report provides an in-depth analysis of incomes and revenues of artisanal and small-scale miners (ASM) in Eastern DRC. Its objectives are to compare these revenues with an estimate of minimum basic needs and other income benchmarks, and to better understand the barriers and factors influencing miners' revenues. Through this, the report contributes to a better and more nuanced understanding of why ASM communities seem to remain extremely poor and mineral wealth does not seem to translate into improved local development.

The report focuses specifically on 3T supply chains from Eastern DRC. To calculate miners' revenues and understand the barriers to it, the report builds on existing data collected by IPIS between 2009 and 2018 as well as tailored field research conducted in Itebero and Nzibira in November 2019. To calculate the minimum revenue required to cover basic needs, the report uses the Minimum Expenditure Basket methodology and builds on data collected in DRC by UNICEF in 2016. While this data can give important indications, caution needs to be applied as the results are not generalisable across Eastern DRC.

The main factors that are found to be influencing miners' revenues are the following:

- The amount of minerals produced, and consequently the amount of investment and pre-financing as well as mechanisation levels at a mine site.
- Seasonality, as revenues for miners tend to be 25% higher in the dry season.
- The world market prices as well as access to phone coverage (this may be a factor in increasing miners' knowledge about world market prices).

- The accessibility or remoteness of a mine can influence the miner's revenue as the distance of the mine from a village can affect the price of the mineral transport. Distance also influences access of information affecting the price, such as the mineral price on the global market, or presence of taxing entities, for example.
- The miner's share of the production in-kind or from the sale of the minerals, i.e. the way in which revenues are distributed amongst the miners and managers, and consequently how well miners are able to negotiate with other actors (cooperatives, managers, etc).
- A main subfactor affecting revenue seems to be the person responsible for paying the mine workers, with a large difference between team leader or mine site manager.
- Gender aspects, as male miners are found to earn 29% more than their female counterparts
- The presence of cooperatives has influence as well, but whether or not that influence is positive or negative in terms of miners' revenues is difficult to define. It seems that miners earn more money when there is no cooperative because they have a higher share of the production. However, when there is a cooperative present, members have a higher share than non-members miners, and therefore earn more money.
- The influence of mine site validation and coverage by a traceability system on miners' revenues remains inconclusive overall.

The research finds that according to IPIS data from 2016 and 2018, most 3T miners in Eastern Congo earn around USD 2.7 and USD 3.3 per day, or between USD 71.37 and USD 86 per month. In the studied areas of Nzibira (South Kivu) and Itebero (North Kivu), most miners make more than this, between USD 3.2 and USD 4.4 per day, or between USD 84.37 and USD 115 (median) per month. When taking the revenues difference between men and women into consideration, a household in which the father and the mother are the miners, their joint revenue is approximately USD 202 per month. The research estimates that to cover basic needs based on a Minimum Expenditure Basket, a miners' household of 6 persons, which is the average in the mining regions, would require roughly USD 243 per month. The report therefore concludes that miners' families have a difficult time to make ends meet – if the mother and father are breadwinners. For a miner acting as single breadwinner, it will be even more difficult, as his income will not amount to half of the costs of basic needs of the family.

However, put into the context of DRC and compared with other income benchmarks and statistics, ASM nevertheless seems to be one of the best income sources. The revenues of miners are significantly higher than the DRC rural poverty line, the DRC minimum wage, and the World Bank's international poverty line (though for the latter, only on an individual level, not on the household level). Miners seem to be significantly better off than other populations in DRC, where 73% of the population live below 1.90 USD per day. In comparison, miners make USD 2.7 – 3.3 per day. In addition, agricultural income pales in comparison with a miners' income: the rural poverty line in DRC is estimated to make USD 4.89 per month, whereas a miner's estimated monthly revenue lies between USD 71 and 115 USD (as explained above).

Beyond ensuring continued access to responsible markets for ASM producers, the report includes the following recommendations to improve the revenues of miners:

- Improve access to finance
- Improve structures and governance of ASM cooperatives
- Improve payment modalities and distribution of revenue within mining operators / cooperatives
- Reduce corruption and informal taxation
- Support gender equality in the ASM sector
- Support provision of and access to social security and health care services

Further research is required to generate more generalisable data. In addition, further research will need to be conducted not only to understand the barriers to miners' revenues, but also the barriers for miners to invest their revenues into the development of their families and communities.

2. INTRODUCTION

Responsible sourcing of minerals has become a requirement and expectation for downstream electronics firms. In recent years, regulation and industry standards relating to so called conflict-minerals have introduced the need to conduct due diligence on suppliers and sub-suppliers, and to get an understanding of the circumstances where and how the minerals were produced. Initiatives and guidelines have been developed to support downstream firms in implementing their due diligence. However, two recent trends have emerged: firstly, increasingly, standards and industry guidelines are moving beyond the ‘conflict-free’ paradigm, and have started including further requirements, including on health and safety or environmental impacts. Secondly, there is an increased realisation that due diligence efforts may help increase transparency within supply chains and prevent financing of armed groups, but this remains at the level of risk management and does, therefore, not automatically translate into higher incomes and better living standards of producers, nor into local economic and social development.

Mineral supply chains of artisanal and small-scale (ASM) mining in developing countries such as the Democratic Republic of Congo (DRC) are estimated to contribute significantly to local livelihoods. The ‘conflict – free’ paradigm requested assurance that mine sites in the DRC were freed from involvement of armed actors and ensure the minerals sector and related supply chain practices would not contribute to prolonged violence by financing armed groups. However, a sustainable peace and local development requires additional efforts.

Local ASM communities remain extremely poor, and mineral wealth rarely translates into increased local development. Anecdotal evidence from the ground suggests that prices paid locally are unfair, and increased reporting burdens related to supply chain due diligence have resulted in disproportionate costs being shouldered by actors furthest upstream – namely, the miners and by consequence mining communities. Alternative assessments suggest that the income miners receive is closely linked to market price and/or relatively high in comparison with other economic opportunities in these locations, and that the principle obstacles related to the development of ASM communities is the local distribution of income and short-term character of ASM mining.

If the goal is to move beyond conflict-free towards increased local development, first, mining communities need to be able to gain enough income to invest in their own development, and second, miners and mineral producers need to be able to invest this income wisely in their own and their community’s development. In order to foster ASM mining’s contribution to local development, it is essential to first understand better the current situation of value retention in comparison to the amount of income needed to cover basic needs in these mining communities. For miners to be able to reinvest in local communities, their current income needs to be more than what is needed to cover basic needs.

This report aims at generating a better understanding of potential gaps between the proceeds of ASM mining and the income needed to cover basic needs of mining communities, and secondly to identify key barriers that limit income or community re-investment. It therefore seeks answers to 3 main questions:

1. Is there a gap between current revenue levels and the revenue required to cover basic needs?
2. What are the key (supply chain) barriers that limit miner’s revenue levels and how have due diligence programs impacted this over time?
3. What are the recommendations that downstream actors could adopt to drive increased miner’s revenue?

To answer these questions, IPIS and Levin Sources have focused their efforts to estimate the miner’s revenue and the costs of the basic needs. Before developing the findings on a miner’s revenue and his/her basic needs, the first chapter summarises existing data and explains the methodology used to add and expand to this data, as well as its biases, challenges and the limits of the interpretation. Concerning the miner’s revenue, the second chapter is entirely dedicated to assess it and identify the multiple factors and barriers that affect it. The third chapter gives a clear definition of the basic needs as we understand it for the mining community in Eastern Congo, and intends to calculate the costs of living. Finally, the conclusion analyses the gap between the miner’s revenue and the costs necessary to cover basic needs and give some recommendations for the downstream actors.

3. LEXICON

ERM :	Estimated Miner's Revenue is calculated by multiplying the miner's share with the generated value per worker.
FARDC	Forces Armées de la République démocratique du Congo (National Army)
GVW	The generated value per worker per site (GVW) is the value (in US dollars) of mineral extracted per miner in one week.
ITSCI	ITSCI programme has implemented a traceability system based on tagging bags at the mining sites to the buying house. ITSCI monitors that the tagged mineral bags come from mining sites that they are compliant with the OECD Due Diligence Guidance. See more on https://www.ITSCI.org/about-ITSCI/
Miner's share	Miners' share : It is the percentage of the production or the selling value that miners will receive. The rest of the share goes to other parties, usually the investor (<i>préfinanceur</i>), or the cooperative, or the owner of the pit or of the mine (who can also be the investor).
SAEMAPE	Service d'Assistance et d'Expertise de la Mine Artisanale et à Petite Echelle

4. METHODOLOGY

For the purpose of this study, IPIS has employed a mixed-method approach: quantitative data analysis was used in order to identify general patterns and significant relationships while qualitative research was used in order to gain more in-depth insights into the actual processes at play and to analyse data where the number of observations was too small for quantitative assessments. This report builds on already existing IPIS data as well as information that has been collected in November 2019 at selected mining sites in Itebero (North Kivu) and Nzibira (South Kivu) by IPIS surveyors specifically for this project. This data collection and its analysis serve the purpose of validating findings from the previous desk research and providing insights that would not have been possible with the existing dataset only.

The purpose of this chapter is to outline the methodology of the analysis as well as to give an overview of the existing data that is used and how it has been collected. The data used for the research on the miner's revenue can be split into 4 different subsets, differentiated in time: existing IPIS data (collected between 2009 and 2018) and data newly collected in November 2019, and captured level (either at the mining site level, or at the level of individual miners).

Table 1: Origin of the data

	Data on Mining Sites	Data on individuals
Existing IPIS data (2009-2018)	4,532 visits in 2,764 sites	134 individuals
New data collected by IPIS in November 2019	16 sites	93 individuals

4.1. Existing IPIS Data (2009-2018)

4.1.1. Existing mining sites Data

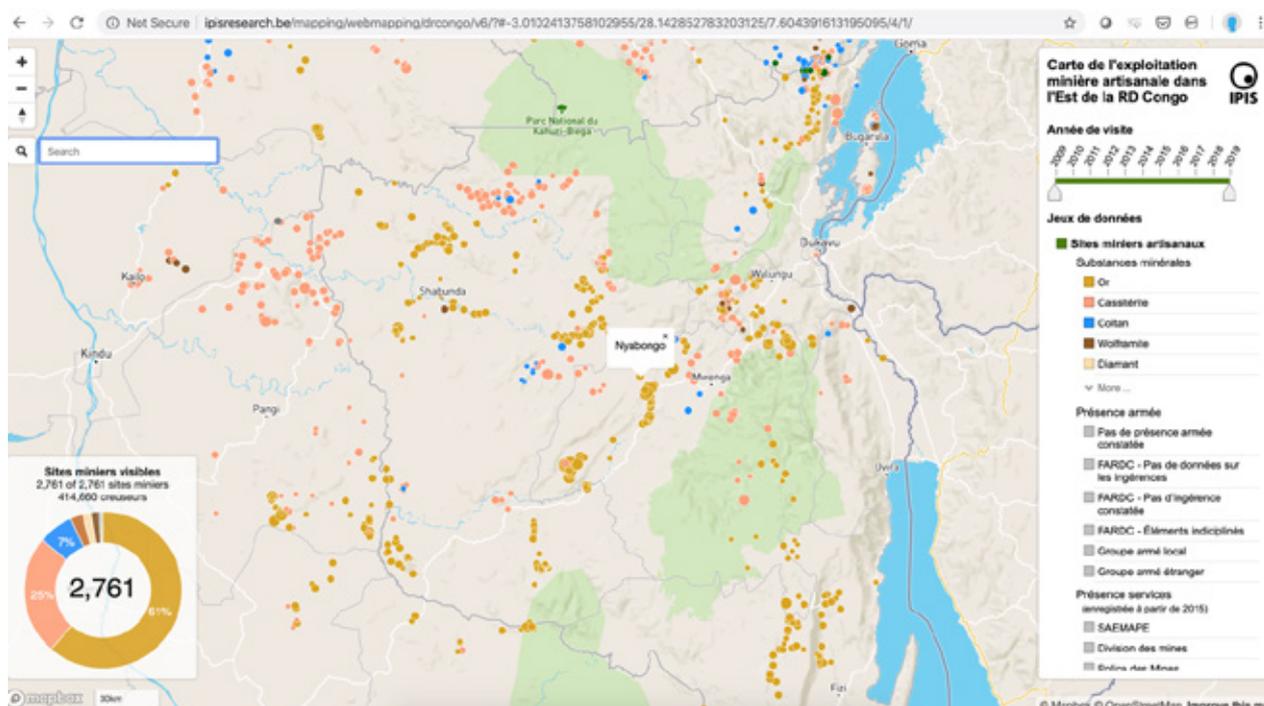
IPIS has been visiting Artisanal and Small-scale Mining (ASM) sites and collecting information through questionnaires in the Democratic Republic of the Congo (DRC) since 2009. Including visits conducted by partner organisations, IPIS' database contains 4532 visits of 2764 mining sites. The use of a standardised core questionnaire, complemented by project-specific questions for every data collection campaign, ensures continuity and consistency of the collected data over years. The IPIS dataset contains a variety of information including: number of workers, estimated weekly production, type of minerals, presence of children and type of work, type of activities of women contributing to the production, presence and/or interference of an armed group, presence and/or interference of state agents, presence of cooperatives, accessibility in dry and rainy season, access to phone network, exploitation type, legal status of the mine, presence or not of active CSOs, conflict occurrence and type of conflicts, numbers of shops on the mining site, payment modalities, equipment used, and presence of a buying house



Entry Gallery near the blue tent in Chembeke Mining, and outside carrier of wolframite visible on the right of the hill

or of local traders on the mining site. The IPIS webmap¹ offers a visualisation of the mining sites, in which some of the information listed above is available for each visited site.

Figure 1: Screenshot of the IPIS webmap



For this report, only mines producing at least one 3T² mineral and with more than zero workers (at the moment of the respective visit) are considered. This yields **a sample of 2024 visits to 970 mining sites** in the years 2009-2018. It appears that the vast majority of the sample (almost 80 %) produces cassiterite.

Table 2: Number of mines per mineral

Mineral	Percentage	Absolute numbers (N = 970)
Cassiterite	79.59 %	772
Coltan	29.28 %	284
Wolframite	9.18 %	89
Gold	8.45 %	82

Furthermore, according to our data, 18% (N = 970, or 172 mines) of the mines produce more than one mineral and 8.5% of them produce gold (82 mines). This explains why the sum of cassiterite, coltan, wolframite and gold mining sites exceeds the sample size of 970.

When more than one mineral is extracted on the same mining site, it is impossible to know how many miners are involved in extracting which mineral. Therefore, in order to correctly assess workers' revenues based on the generated value per worker (see section 4.3 on the Theoretical model), gold is included in the analysis. However, it only plays a rather complementary role and the focus of this report remains on the 3Ts.

1 <https://www.ipisresearch.be/mapping/webmapping/drcongo/v6>

Table 3: Number of 3T minerals produced per mine

Number of 3T minerals produced per mine	Percentage	Absolute numbers (N = 970)
One	82.27 %	798
Two	17.42 %	169
Three	0.31 %	3
Total	100 %	970

4.1.2. Existing individual-level data

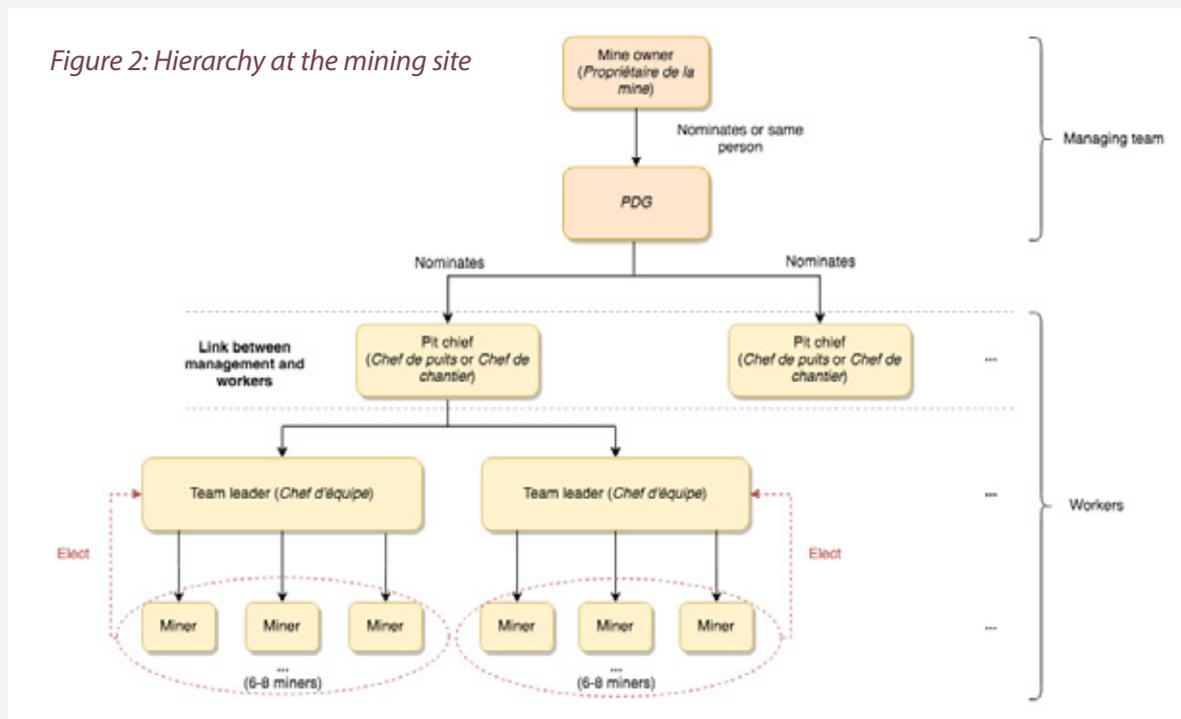
In addition to the mining site database, existing individual-level data from a previous IPIS research project has been used. This data contains information on miners' revenue at 7 mining sites in Maniema province (Punia territoire) and North Kivu province (Walikale territoire) from summer 2018.

4.2. Data collected in Itebero and Nzibira in November 2019

Based on the findings of a preliminary analysis of already existing IPIS data (see section 4.1), IPIS selected the mining areas of Itebero (Walikale territory, North Kivu province) and Nzibira (Walungu territory, South Kivu province) for further data collection specifically for this report. Focusing on Itebero and Nzibira allowed collecting data on the different variables of interest in a relatively small area. These variables had been identified by IPIS and Levin Sources as potentially affecting the miner's revenue:

- (non-)participation to the ITSCI programme,
- (non-)presence of a cooperative,
- (non-)presence of an armed group,
- (non-)presence of a state agency, and if present, its (non-)interference,
- the amount of production,
- the number of workers,
- distance from the mine to the selling point,
- type of minerals (coltan, wolframite and cassiterite),
- modalities of miner's payment (daily, in-kind or in cash after the sale).
- Sex of the miner
- Type of work done by the worker

Hierarchy and roles of workers on a mining site in Eastern Congo



The mine site management is generally strongly hierarchical and patriarchal. Even though all sites are different, there are some common characteristics, which have strong historical roots and which are resistant to change. At the top of the hierarchy is the mine owner, (propriétaire). In many cases, the mine owner is a local chief, but it can also be a local business man. This person is in charge of the mine site and manages relations with external actors such as investors, local (customary) authorities and mining agents of SAESSCAM or Division des Mines. Typically, the owner nominates a Président Directeur-Général (PDG) who is the main operational manager of the mine, controlling the everyday activity on the mine site. It is frequent that the PDG is also the mine owner. When the mine is composed of multiple pits (puits) or chantiers, the PDG will hire pit chiefs (chefs de puits or chefs de chantiers), who are workers with a certain level of authority over their colleagues due to their position on the social ladder. As a worker inside a pit and his position as the trusted man of the PDG or of the owner, the pit chief is the link between the “managers” and the workers. For this privileged position, the pit chief earns more than the miners.

These pit managers supervise different teams of workers, sometimes represented by a chef d'équipe (team leader), which has been “elected by the workers”. These teams are usually composed of 6 to 8 diggers who are extracting the ore from the river or from the ground. The diggers bring the gravel or the earth containing ore to washers who will remove dust and impurity to find the mineral. These washers are either part of the team itself (specially in gold mining sites) or they are “subcontractors” working for several teams. These two positions, diggers and washers, form the majority of the miners and are found across all mining sites. However, a variety of other roles exist a mining site, such as transporter (of minerals, water or food), crushers, metal-detectors users and/or mercury users, which are specific to each site.

Two teams, each composed of two surveyors coming from civil society organisations with a past history of working with IPIS, visited a total of 16 mining sites and 5 trading centres (so-called *points de vente*). Their mission lasted 10 days (beginning of November 2019) and their objectives were to observe and conduct interviews with several key informants so as to complete an extensive mobile questionnaire on each mine site (using the *OpenDataKit* tool, ODK). Furthermore, surveyors conducted 93 face-to-face in-

interviews with miners to obtain more details about their costs of living, their socio-economic background, their revenue and their investments and savings plans. A third questionnaire targeting shopkeepers aimed at collecting information on prices of goods used to cover basic needs, based on the Minimum Expenditure Basket (MEB) approach (10 shopkeepers were interviewed, two each per trading centre).

IPIS surveyors were recruited as members of civil society organisations active in the sector of natural resources exploitation and with a previous working experience conducting field visits on mining sites for IPIS. Therefore, they all have a deep understanding of the artisanal mining sector.

4.2.1. New mining sites data

The new mining sites data was collected in 16 mines sites in the mining areas of Itebero (7) and Nzibira (9). The surveyors filled in the IPIS core questionnaire which was slightly adapted for this study. Three of the visited mines were abandoned.

4.2.2. New individual-level data

This questionnaire was specifically designed for this study and focused on miner’s revenue, expenditure and costs of basic needs. However, “miners” can include different positions (see the box “Hierarchy and roles on a mining site in Eastern Congo”, below) who are paid differently. In order to keep a representative sample, IPIS has decided to interview only miners working as “diggers” or “washers” because they form the majority of the workers in the artisanal mining sector.

4.3. The Theoretical model

While there is no comprehensive data on miners’ revenue³ for eastern DRC, IPIS data allow for the calculation of an estimated miners’ revenue based on two factors: **the generated value per worker at a mining site (GVW)** and **the miner’s share**.

The generated value per worker per site (GVW) is the value (in US dollars) of mineral extracted per miner in one week. The generated value per worker is calculated as follows:

$$GVW = \frac{\text{Weekly production of the mine site} * \text{Selling price}}{\text{Number of workers}}$$

In the case of mines that produce more than one mineral, the summed generated values of all minerals are divided by the number of workers. As a result, we calculate the GVW as follows:

$$GVW = \frac{\text{Weekly prod (mineral1)} * \text{Selling price (mineral1)} + \text{Weekly prod (mineral2)} * \text{Selling price (mineral2)} + \dots}{\text{Number of workers}}$$

The second crucial element is the **miner’s share**. The miner’s share is either a portion of the in-kind production or cash money resulting from the sales of the minerals that miners can keep after cost deduction related to pre-finance. The portion of the miner’s share is variable (see section 5.3.4 for further explanation), depending on the local agreement between mine owners, local chiefs and miners and the existence of a pre-financing. Although most of the miners receive about half of the GVW (section 5.3.4)⁴, the accurate miner’s share is known for 327 sites (visited between 2016 and 2018 by IPIS for previous research). Therefore, in the absence of detailed data on miner’s share, we have calculated the estimated miner’s revenue (EMR) as follows.

Case 1 (general calculation):

$$EMR = GVW / 2$$

However, when the miner’s share of a specific single mine was known, the miner’s revenue was estimated according to it, and calculated as following:

Case 2 (specific calculation where data exists):

$$EMR = \text{miner's share}(\text{mine}_{\text{specific}}) * GVW$$

In sum, if the miner's share is unknown, we consider the miner's revenue as being half the generated value per worker per site (case 1); if the miner's share is known for a mining site, the estimated miner's revenue (EMR) is calculated according to it (case 2).

4.4. Statistical tests

We used statistical methods in order to test the relationship between our numeric variables (e.g. GVW or selling price of the minerals) and a range of categorical variables including: ITSCI's status, ministerial qualification of the mining sites, presence of state services, presence of armed groups, accessibility to the mining site, seasonality.

Although these methods can test statistical relationships, it is noteworthy that they cannot be used to conclude on which relationships are causal. Therefore, while it is relevant to test whether there are significant differences⁵ in GVW or EMR between different categories (e.g. ITSCI vs non-ITSCI sites) – to conclude on a statistical relationship – these tests cannot assert that these categories actually explain the differences observed in GVW or EMR. For this study, we used parametric (i.e. t-test and ANOVA) and non-parametric (i.e. Mann-Whitney and Kruskal-Wallis) tests. The choice of the statistical test depends on whether our numeric variable follows a normal distribution and the number of categories in the categorical variable to test.

4.5. Assessing minimum needs/expenditures

4.5.1. Minimum Expenditure Basket (MEB)

The Minimum Expenditure Basket (MEB) methodology was developed by humanitarian agencies as a way to assess the basic needs of populations in emergencies.⁶ The MEB designates requirements to meet basic needs of a household on a regular or seasonal basis and their average costs. It aims at establishing an absolute minimum threshold or 'basket' of goods and services required to live through an emergency in relative decency, beyond mere survival.

The MEB is always tailored to a specific context and situation, rather than a generalized figure like a poverty line or a minimum wage. It is usually calculated with the input from affected populations (what items do they see as absolutely necessary, and in what quantities), minimum humanitarian standards (what is considered absolute minimum for populations in crisis)⁷, and an assessment of local markets (what are the costs and prices of these minimum items locally). While the MEB definition varies, it usually covers goods and services under the following categories: food, shelter, water, sanitation and hygiene (WASH), clothing, household items, health, education, costs of livelihoods and sometimes also transportation and communication. Sometimes, additional expenditures are added to ensure a decent living, such as costs for recreation and leisure, as well as costs of social security and taxes.⁸

In this sense, the MEB is similar to a calculation of a minimum living wage as determined in the Anker methodology.⁹ The living wage applies to remuneration or salary for hired workers, whereas the "living income" applies to self-employed workers or other income earning situations. In the context of artisanal

5 By convention, we refer to differences as "statistically significant" when the p-value resulting from statistical tests is below the widely accepted threshold of 0.05.

6 A MEB is often used in cases where humanitarian agencies support populations in need with cash grants or vouchers, or use mixed intervention methods (in kind support, vouchers and cash). See for example the Chapter on MEB in the Operational Guidance and Toolkit for Multipurpose Cash Grants, developed by the Cash Learning Partnership, at <http://www.cashlearning.org/downloads/mpg-toolkit-pdfs/mpg-part1.2.pdf> (22.11.2019).

7 This is defined in the SPHERE Core Humanitarian Standard: <https://www.spherestandards.org/humanitarian-standards/core-humanitarian-standard/>

8 More details on the methodology to calculate a 'living wage' or 'living income', see the Global Living Wage Coalition at <https://www.globallivingwage.org/about/anker-methodology/>

9 See: <https://www.globallivingwage.org/about/anker-methodology/>

miners, “living income” is the most appropriate concept. The Anker methodology is also applicable to this.¹⁰ Like the MEB, the Anker methodology includes a definition of a ‘decent standard of living’ as including food, water, housing, education, health care, transport, clothing, and other essential needs, including provision for unexpected events.¹¹

<p>Definition of a Living Wage¹²</p> <p>“Remuneration received for a standard workweek by a worker in a particular place sufficient to afford a decent standard of living for the worker and her or his family. Elements of a decent standard of living include food, water, housing, education, health care, transport, clothing, and other essential needs, including provision for unexpected events.”</p>	<p>Definition of a Living Income¹³</p> <p>“The net annual income required for a household in a particular place to afford a decent standard of living for all members of that household.</p> <p>Elements of a decent standard of living include: food, water, housing, education, healthcare, transportation, clothing, and other essential needs including provisions for unexpected events”</p>
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The calculation for a living wage or living income consists of two steps: The first estimates the cost of a basic but decent standard of living in a particular context, and the second determines if that estimated living wage is being paid to workers. In this sense, the MEB is similar to the first step in that it tries to estimate the cost / expenses needed for a basket of goods and services considered minimum. Like the Anker methodology, the MEB also involves local stakeholders and affected people to determine this basket, consults standards and secondary sources by the UN and other recognised organisations to determine minimum amounts, and requires an assessment of local prices and costs of the goods and services in question.

While the MEB and Anker methodologies are similar, the main difference is that the MEB is often used in humanitarian emergency settings rather than in stable situations. Through that, it is often determined on the basis that people’s status of living is not permanent but for an emergency period only, and that they will be able to return to ‘normalcy’ after some time. The MEB might therefore in some cases be more minimal than a living income or living wage calculation would be.

4.5.2. UNICEF’s MEB for DRC

The MEB methodology was used for this assessment because it is similar to a living wage calculation, and because UNICEF conducted a MEB calculation for DRC in 2016, which can be taken as a reference point. The MEB for DRC was calculated for a small household (A, 2.3 persons), an average-sized household (B, 5 persons), and a large household (C, 8 persons) and resulted in the following amounts needed per month and household:

10 See: <https://www.globallivingwage.org/about/living-income/>

11 <https://www.globallivingwage.org/about/anker-methodology/>

12 <https://www.globallivingwage.org/about/anker-methodology/>

13 See: <https://www.globallivingwage.org/about/living-income/>

Table 4: Minimum Expenditure Basket

Topic	Household A: 2.3 persons	Household B: 5 persons	Household C: 8 persons
Food security	USD 29.67	USD 64.50	USD 103.20
Non-Food items	USD 70.77	USD 86.30	USD 150.72
Education	USD 8.50	USD 17.00	USD 25.50
WASH	USD 17.76	USD 26.12	USD 35.41
Health	USD 7.50	USD 15.00	USD 22.50
Livelihoods	USD 36.00	USD 36.00	USD 36.00
	Household A	Household B	Household C
	USD 170	USD 245	USD 373

An exchange rate of USD 1 USD = FC 940 was used at the time. A detailed view of items, quantities and prices used in the calculation of the 2016 UNICEF MEB, please see the Annex.

4.5.3. Validating the MEB in an ASM context

While UNICEF's 2016 MEB for DRC was taken as a basis for this study, IPIS and Levin Sources assessed its validity in the context of ASM communities and adapting it where necessary possible. Indeed, the UNICEF MEB was calculated only for specific emergency situations such as displacement. We thus tried to validate and corroborate it through some additional data points from the field study conducted in November 2019. A full survey of miners to determine a 'miners' basket' and a full market assessment to determine the local prices was not possible with the budget and time allocated. Therefore, we used key data points and approximations to get a better view of what a MEB in ASM areas might look like. While this remains a rough estimate, it helps to adjust UNICEF's MEB to the needs of ASM miners specifically as well as for the current economic and financial context around mine sites, including exchange rate considerations and localised inflation typical for mineral economies.

We therefore adjusted or updated UNICEF's MEB as follows:

- A. We adapted the livelihood expenditure category:** The UNICEF MEB includes expenditures necessary for a household conducting subsistence agriculture as a livelihood. We have adapted this MEB by assessing the expenditure needs for a mining livelihood, including the tools required and expenses related to accessing and working in the mine.
- B. We added two expenditure need categories** that the UNICEF MEB does not include: 'Other needs', under which we group expenditure needs for communication and leisure activities,¹⁴ and the category 'debts and savings. We have added these categories because the UNICEF MEB covers only absolute minimum needs in a situation of emergency, and because other calculations of a 'living wage' or 'living income' sometimes include such categories (often under the ability to cover unforeseen events and emergencies).¹⁵
- C. We attempted to recalculate some of the expenditure needs using data on local, current prices** collected from shop keepers in the market centres nearest to the mines. We collected local price data for some of the food items, household and livelihood items, as well as some indicative price data for health, education and communication. This data allows us to account for local inflation of prices to a certain degree and to triangulate the miners' reports about their (actual) expenditures.
- D. We use actual expenditures as reported by the miners** to understand how this compares with the minimum needs of the UNICEF MEB and to consider whether these might need to be adapted. While actual expenditures are not equal to minimum needs (see caveats below), they still provide an indi-

cation of the local context and can help to make an approximation of what might be considered as a minimum expenditure need in an ASM context.

4.5.4. Caveats

The results and analysis described in this report should be considered in conjunction with the following caveats:

- The sample of our field study was relatively small, therefore no general conclusion across other 3T supply chains was possible.
- All calculations and numbers are based on averages or medians, both for the UNICEF MEB amounts as well as our own numbers and calculations. Therefore, the results provide view of an average or median only for a specific place (Itebero and Nzibira) and time (November 2019), which cannot be extrapolated accurately to another region of DRC or to another time period.
- The UNICEF MEB assigns the full cost of an item in the basket to the expense needs per month. This method assumes that all items have to be bought anew due to the emergency situation. We attempted to get clarification from UNICEF on this but we did not hear back from them before the deadline. In our own calculations, we assume that each item has a replacement rate which is often more than one month.
- Due to constraints in time and budget, it was not possible to develop a new MEB fully tailored to the ASM context within this study. Therefore, we use the data from the UNICEF MEB and only attempt to adjust it where reasonably possible, based on the data we collected on local prices and miners' actual expenditures.

Miners' actual expenditures cannot be taken as an indication of minimum need – for example, their expenditures on health may be low because they do not visit a healthcare centre due to the long distance from the mine site. However, we use miners' actual expenditure as an indication through which we can assess whether UNICEF's MEB calculation are likely to be relatively appropriate in the ASM context. We indicate when we use data on actual expenditures as reported by miners. When we use this data to adjust the UNICEF MEB, we explain why, how and based on which assumptions.

Analysing field data requires certain assumptions which are made explicit in this report and supported by explanations based on our previous experience in ASM context or other qualitative data. Some of these assumptions need to be tested in subsequent research.



Cassiterite mine in Kaniola, South Kivu

5. ANALYSIS OF MINER’S REVENUE

5.1. Estimating the miner’s revenue from an empirical observation

A comparison between existing IPIS data (2016-2018) and the data collected in Nzibira and Itebero (2019) shows that the difference with the median of the estimated miner’s revenue (EMR, see methodology, section 4.3 on the Theoretical model) is only USD 3 (**USD 16.47 and USD 19.47 weekly, respectively**). However, when the miners are directly asked how much their share of the GVW is (i.e. individual questionnaire), the median EMR is nearly 25 % higher for the workers in Itebero and Nzibira than the EMR of the miners interviewed between 2016 and 2018 (USD 26.44 and USD 19.84, respectively).

Table 5: Estimated Miner’s Revenue (EMR) mean and median according to data collected in 2016-2018 on 327 sites and 134 miners and data collected in Itebero and Nzibira in November 2019 for the purpose of this present research.

	Existing IPIS data (2016 – 2018 only)		Data collected in Itebero and Nzibira (November 2019)	
	Mining-site	Individual	Mining-site	Individual
Revenue	Estimated 327 sites	Real 134 individuals on 7 sites	Estimated ¹⁶ 13 sites	Real 76 individuals on 13 sites
Mean weekly EMR (in USD)	32.62	29.01	20.48	25.83
MedianEMR (in USD)	16.47	19.84	19.47	26.44

These observations lead to the following conclusions. Firstly, the miner’s revenue at the mining sites around Itebero and Nzibira appears to be higher than in other areas. Therefore, these mining sites **cannot be considered as representative of all the mines in the IPIS database**. Secondly, revenues based on the individual-level data are higher than the estimations based on the mining-site data.¹⁷ The three following hypotheses could explain the latter:

1. As explained in the methodology (section 4.2.2), the individual-level data covers diggers and washers only, which are at the upper end of the revenue scale of the workers (excluding managers such as mine or pits owners, pit chiefs, PDG, as well as ‘service providers’ such as transporters, etc). Because their role is essential for the extraction of minerals – especially the diggers – diggers and washers take the most risks and make the most intense efforts in the mineral production. However, they do not have any managerial or decision-making power, and therefore, they are also easily exploitable.
2. The number of workers per mining site – used to calculate the GVW and then the EMR – may, at least in some instances, be too high due to the migration of miners. In Nzibira, one surveyor explained that on at least 3 mining sites *“the miners are mobile. Every time, they move from one mine to another when there is production. Therefore, the same miners can work on different mining sites at the same time. This makes the estimation of the number of workers on a mining site difficult”*. Moreover, even though the management does not keep a record of the presence, IPIS surveyors report that mine management tends to overestimate the number of workers to convince visitors – who could be potential buyers or investors – that production is promising.¹⁸
3. In Itebero and Nzibira, the reported miner’s share was often higher than the one reported in other mines visited by IPIS. Indeed, in 45% of the mining sites (N = 93), the miner’s share is 80 % of the GVW

¹⁶ Based on the average miner’s share of 59,52 % at the sites visited during this project.

instead of the most frequent share which was previously assessed as 50 % (see figure 6 in the Section 5.3.4 on the Miner 's share).

5.2. Observation and Analysis of the Estimated Miner's Revenue in Itebero (North Kivu) and Nzibira (South Kivu)

5.2.1. *The socio-economic background of the sample in Itebero and Nzibira*

This section focuses on the results obtained from the data collected from miners that IPIS surveyor teams interviewed at mining sites around Itebero (North Kivu) and Nzibira (South Kivu). In total, 93 miners have responded to our questions. Initially, the field mission had to cover cassiterite, wolframite and coltan mining sites. However, surveyors noted that wolframite and coltan mining sites had been abandoned recently because the prices had dropped. Traders in Itebero reported not to be interested in buying coltan because the transport costs were too heavy to support. This explains why 91 % (N = 93) of the interviewed miners are active cassiterite mining sites. Furthermore, despite continuing efforts to promote access to artisanal mining for women, it remains a predominantly male activity, which explains the over-representation of men (83%, N = 93) over women in our sample of miners. Eventually, 71 interviewees were diggers (66 men and 5 women) and 22 were washers (11 women and 11 men).

Our study shows that 73% (N = 93) of the miners work the entire year in the mining sector. On average, the interviewed miners work 6 days a week in both seasons. During the dry season, most miners work 8 hours a day, and 6 hours in the rainy season which corresponds to observations made in other mining areas, such as Mambasa (Ituri).¹⁹ From this daily schedule and yearly agenda, we can deduct that mining is their only income generating activity. For those working seasonally, they mostly mine from June to November, in the dry season, during the peak of production, and certainly work in the field in the rainy season.

5.2.2. *Payment modalities in Itebero and Nzibira*

As seen above (see table 5), **the average weekly salary of miners in the 13 mining sites was estimated at USD 25.83, the median being USD 26.44 per week, or USD 4.4 per day** (considering a week of 6 days, which is the rhythm of most of miners). The reported salary ranges from USD 0.6 to USD 72.11. **Most of the miners are paid once a week**, or four times a month (54.5%, N = 93). Although the weekly payment is based on the production and the sales vary from one week to another, the difference between each payment is rather small. This relative consistency in the payment amount implies that, if the selling price does not change, the capacity of extraction remains stable once the minerals have been found.

Our study shows that 17% (N = 93) of the miners had not been paid in the past month, of which 56%, not in the last 3 months. It mostly concerns miners extracting wolframite who suffer from not attracting buyers due to low price on the global market, and those working independently. Another category of miners who have not been paid in the last months are those who are pre-financed but have not yet reached the minerals. The investor (*préfinanceur*) provides just enough to buy food and will pay the miners with the benefits from the sales of the minerals they have yet to extract.

19 G. de Brier and H. Merket, Monitoring report on Artisanal Gold Monitoring Pilot in Mambasa, Ituri, IPIS, September 2017, p. 23. <https://ipisresearch.be/wp-content/uploads/2017/10/201710-Monitoring-report-PPA-Engels.pdf>

Typically, revenues are paid either in cash in francs congolais (67%, N = 93) or in in-kind of the minerals that they have extracted and sold themselves at the market or to a trader (22%, N = 93). Another minority (11%) concerns those working independently, which means that they are not part of a team, but they work alone for the extraction, the washing and the sale of the minerals. There was also one case where the miner was working the entire month for free in exchange of one day for which he was entitled to keep the entire production.

5.2.3. *Difference in revenue between men and women*

As figure 2 shows it, the sex of the worker lead to differences in individual revenues at the same mining site. Indeed, when considering the median, **most of men earn around 29 % more than women (about USD 8.4 more per week).**

Table 6: *Miner’s revenue disaggregated per sex.*

Most recent payment by sex (in USD)	Average	Median	Minimum	Maximum	Number of respondents
Male	27.28	29.44	1.2	72.11	63
Female	18.81	21.03	0.6	36.05	13

While the data collection was gender-sensitive, as explained in the methodology, women are largely underrepresented in the sample. Furthermore, the study was too limited in scope and budget to investigate more in detail this difference.

However, it is well-known that women often face challenges, which can be based on stereotypes and traditions to access good positions with the ASM sector.²⁰ Therefore, women are involved in less profitable tasks such as transportation, crushing and treatment of tailings, lucrative tasks are monopolised by men, such as diggers.²¹ Furthermore, women are more likely to be subject of unfair retribution. For example, In Muhinga cassiterite mining site (Kabare territory), women crushing and transporting minerals are not paid in cash but can keep the waste, which is still mineralised.²²

Table 7: *Miners interviewed in Itebero and Nzibiraper function*

Function by sex (Number of respondents)	Male	Female
Digger	66	5
Washer	11	11

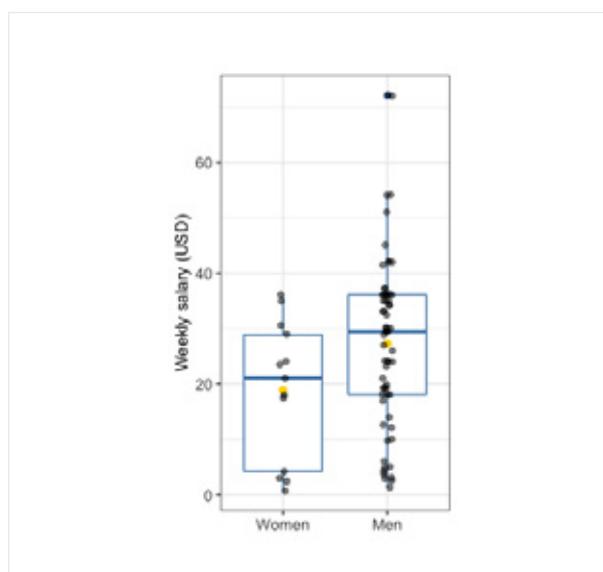


Figure 3: *Difference in weekly salary between women and men (box-and-whisker plot). The average salary is represented by a yellow dot. The black dots represent the weekly salary of each individual for both categories.*

20 See Women’s international League for Freedom and Peace, Life at the bottom of the chain: Women in Artisanal Mining in DRC, August 2016
 21 A study based on IPIS database of mining visited between 2016 and 2018 showed that only in 24% of mines where women are working, they are involved in digging. IPIS, Mapping artisanal mining areas and mineral supply chains in eastern DR Congo: Impact of armed interference & responsible sourcing, April 2019, p. 35
 22 IPIS, Mapping artisanal mining areas and mineral supply chains in eastern DR Congo: Impact of armed interference & responsible sourcing, April 2019, p. 35

5.2.4. Difference in revenue between washers and diggers

In the areas of Itebero and Nzibira, **there is no significant difference between the estimated revenues of washers and diggers (i.e. USD 30.0 and USD 30.6, $p > 0.1$)**. This might be due to the fact that miners usually constitute teams and are mutually dependent on each other to conduct all the mining operations. Other support activities such as carrying out minerals, crushing the ore, working with a motor pump are usually not conducted by members of the team and often delegated to other workers paid with a fixed amount of cash or ore. Moreover, the type of payment does not make a difference for the revenue level: **miners who are paid in cash achieve similar revenues as miners who are paid in minerals.**²³

5.3. Observation and Analysis of the Estimated Miner's Revenue in IPIS data collected between 2016 and 2018

In the methodology (Section 4.3 on the Theoretical model), we have explained that the Estimated Miner's Revenue (EMR) was calculated with the generated value per worker at a mining site and per week (GVW). These two values are largely influenced by certain factors that we have identified below.

5.3.1. The production

In theory, miners who can sell more minerals will earn more money. However, production capacity is closely linked to the (un)availability of pre-financing. Due to the lack of investment, production tends to decrease in certain mines where the mineral is more difficult to extract (see paragraph 5.4.5 on seasonality). Based on discussions with miners, many of them complain that the lack of pre-financing is a barrier to buy adequate equipment (see paragraph 5.4.5 on seasonality). In Eastern Congo most of the mines are indeed underequipped. In a previous research,²⁴ IPIS had defined level of mechanization as following:

- Low: Only pickaxes, shovels, machetes, iron bars and small rudimentary tools are observed
- Middle: Jackhammers, pulley, hoist or motor pumps are present
- High: crushers, grinder, fan or metal detectors are observed.

A study by IPIS in the territory of Mambasa (2017) shows that amongst seven mining hubs located in South Kivu, the mining sites in the surrounding of five of them were ranked as "low level of mechanization". On the large majority of mines (over 80%), workers use the most rudimentary methods of extraction, disposing of nothing more than pickaxes, spades, shovels, hoes, machetes, hammers, and mortars. Over 15% dispose of some more advanced tools such as jackhammers, motor-driven water pumps, and metal detectors. Rock crushing and grinding machinery (called 'concasseur' and 'broyeur') are only identified on a few mines.²⁵ In summary, production clearly influences the amount of money the miners will earn.

5.3.2. Number of workers

On the one hand, the more miners there are, the smaller the bid of each worker will be. On the other hand, less miners makes the work more difficult and slows down the production. In Itebero and Nzibira, the "independent miners" represent a large proportion of those who have not been paid in the last 3 months because of the lack of workers (see Section 5.2.2 on the payment modalities). Figure 3 below shows the generated value per worker compared to the number of workers for the sites below 500 workers. We can see that the GVW tends to decrease when the number of workers increases. However, most of the mining sites, and especially the one less populated, have not reached their "potential" GPW.

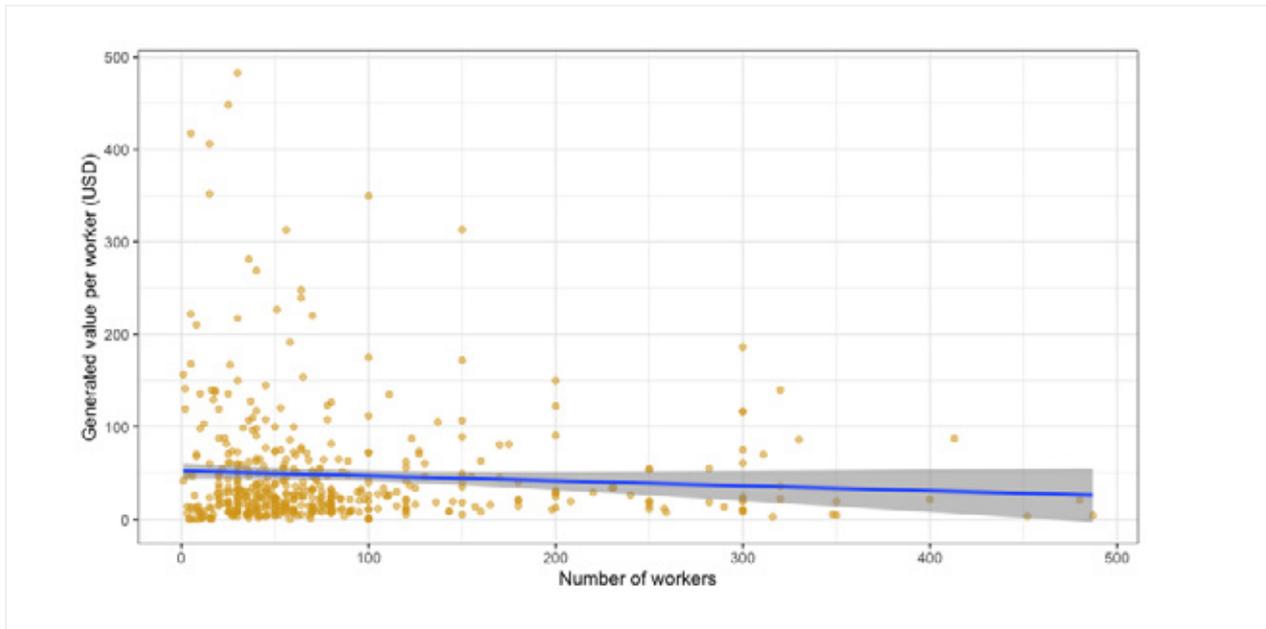


Figure 4: Comparison of the generated value per worker (GVW) with mining sites where the number of workers is below 500)

Figure 4 shows that the most of the mining sites do not reach the potential of production in comparison with the number of workers, which confirms the claims of the miners that they are underproductive, which is the reason to ask for funding to buy better equipment.

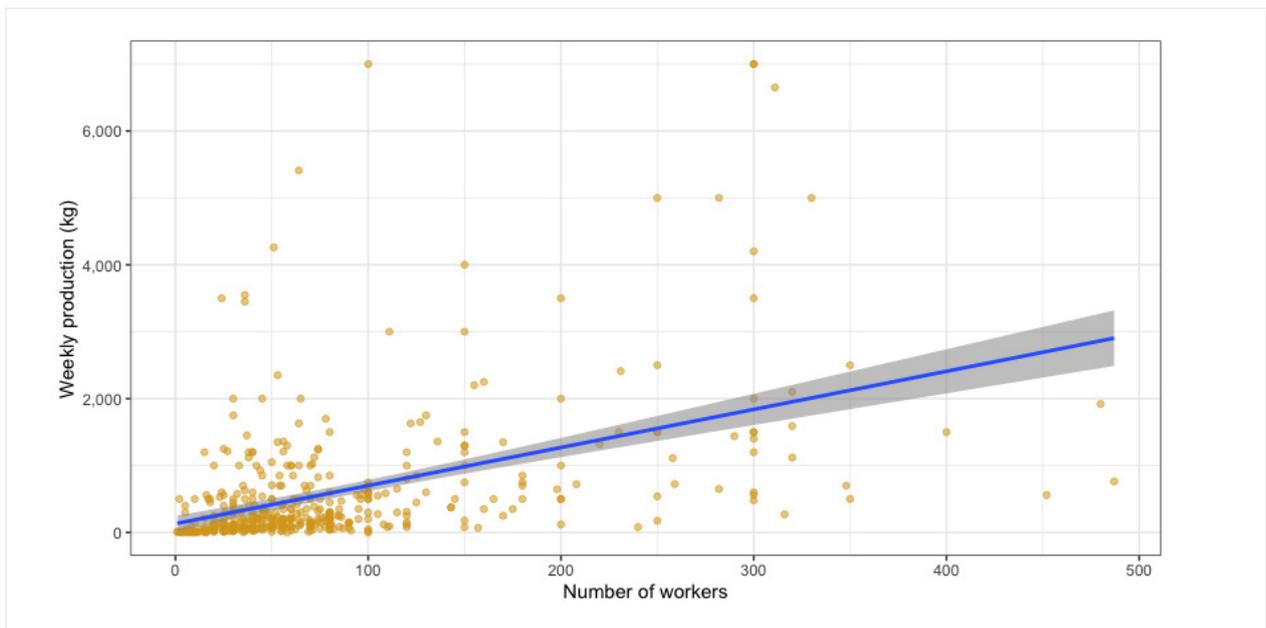


Figure 5: Comparison of the weekly production with mining sites where the number of workers is below 500)

5.3.3. The selling price

The selling price highly affects the miner's revenue. Initially measured in Congolese Francs, the selling price was converted in USD at respective up-to-date exchange rates. It is noteworthy that the production figures and selling prices at the moment of the visit are subject to changes due to external factors such as the season and the price on the global market. While both values may not be representative for this particular mining site over a longer period, these "measurement deficits" can be assumed to be uniformly distributed and thus to even out when considering the entire sample. This assumption is supported by the fact that both selling prices and production volume do not vary much over the course of a year (see figure 13 in Section 5.4.5 about the seasonality, and figure 5 for cassiterite). Therefore, we assume that collecting this data at a specific point in time should not lead to a systematic bias in the data.

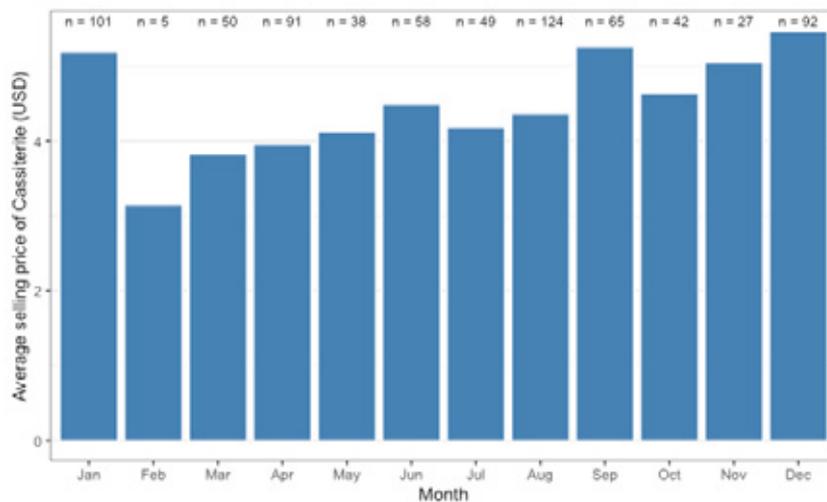


Figure 6: Average selling price of cassiterite (in USD per kg) by month ("n" corresponds to the number of observations)

5.3.4. The miner's share

The miner's share is the percentage of the production or the selling value that miners will receive as a revenue. The rest of the share goes to other parties, usually the investor (*préfinanceur*), the cooperative, and/or the owner of the pit or of the mine (who can also be the investor). In most cases, the miner's share takes place once all other costs have been deducted, such as the pre-financing, the tax or the costs of delegated activities (motor-pumps, metal detectors for example). Figure 6 shows that most of miners receive around 50% of the generated value, which will correspond to their estimated revenue (EMR). However, in some cases, miners would only receive 10% of the GVW because other actors, such as local chiefs, authorities, armed groups and/or cooperatives would demand their shares. On the contrary, in some mining sites, more fortunate miners working without any sort of pre-financing, and completely independent from external actors manage to earn 100% of their yields.

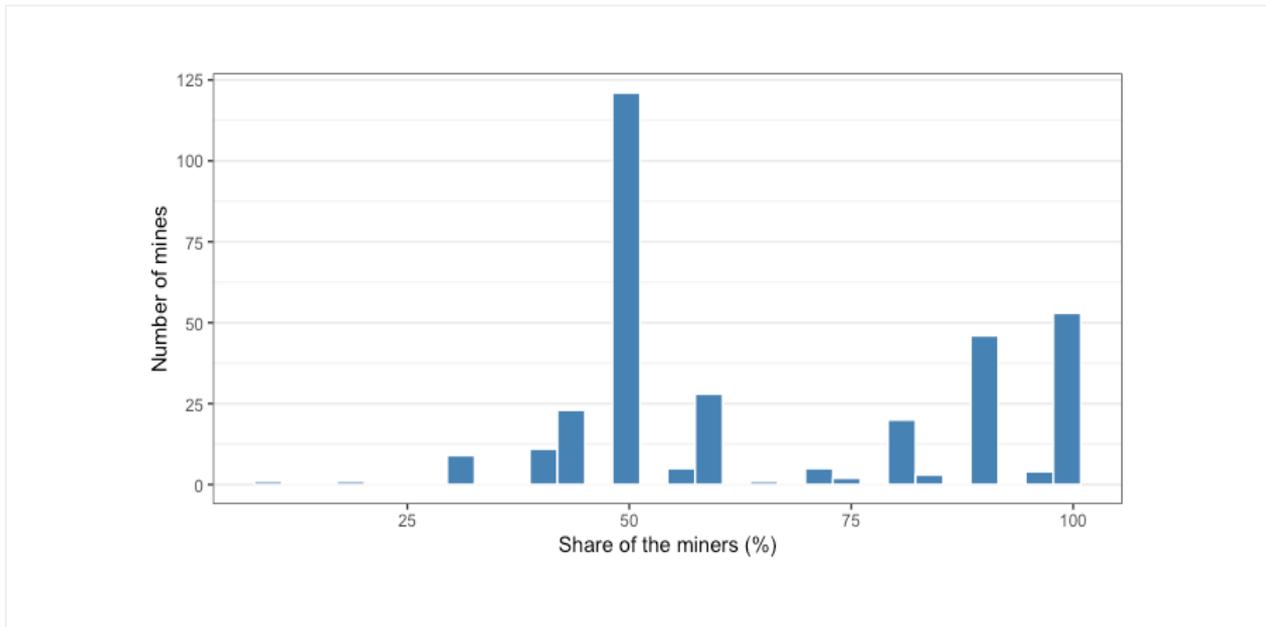


Figure 7: Distribution of the share that the workers receive

Table 8: Miner's shares in mines visited by IPIS between 2016 and 2018

	Average	Median	Minimum	Maximum	Number of sites
Share of the revenue earned by the workers (%)	66.09	55	10	100	333

The miner's share is the result of negotiation with the other actors, and should be contextualised locally. In some cases, an actor, such as a state service, an armed group or a cooperative appears or disappears and the shares would be renegotiated. In other cases, the pre-financer would renegotiate his pre-financing condition. Figure 7 shows that even within a single mining site, the miner's share can vary greatly.

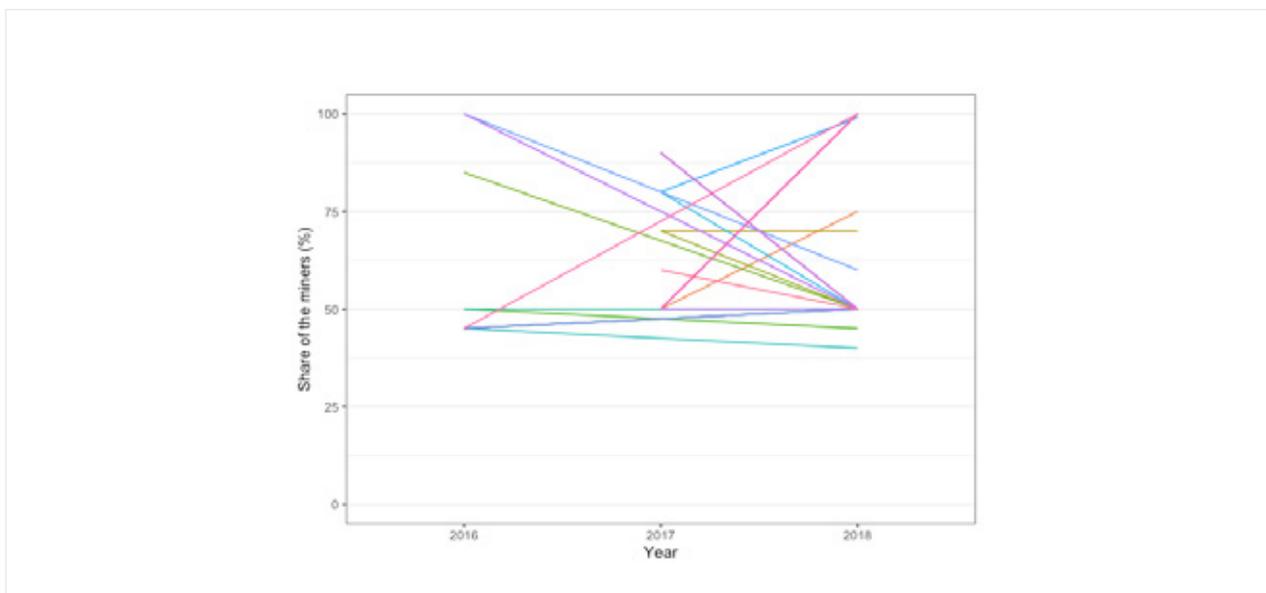


Figure 8: Changes of the share the miners receive over time per mining site. Each line represents a different mine and corresponds to the evolution of the share over time (based on data collected by IPIS)

In practice, the higher the share of the generated value is, the higher the revenues of the miners are. On average, **every additional percentage point the workers receive can be associated with an increase of the revenue by USD 0.36 per week.**

5.4. Variables that can potentially affect the miner's revenue

Based on previous research²⁶, the following variables have been identified as potentially affecting the miner's share and/or the generated value:

- *Inflation* may alter the real value (i.e. purchasing power) of miners' revenues. In this research, inflation is included by converting all variables captured in Congolese Francs into USD at respective up-to-date exchange rates.
- *ITSCI* mines may achieve different selling prices than non-ITSCI mines.
- The *RCM (Regional Certification Mechanism) certification of the mine* may affect selling prices: as a member of the International Conference for the Great Lakes Region (ICGLR), DRC has signed the Regional Initiative for the Natural Resources (RINR); and one of its most emblematic tools is the Regional Certification Mechanism (RCM) for 3TG. The RCM includes the mine site and mineral export certification criteria, traceability and chain of custody requirements. The RCM classifies sites as green, yellow or red. Green flagged mines can produce minerals for certified export. Yellow flagged mines have a period of six months to resolve the infractions of one or more of the Regional Criteria Mechanism (RCM) criteria, but are allowed to produce and export during this 6-month probation period.²⁷ And red flagged mines are banned from export due to the seriousness of infractions. In the DRC, RCM certification is carried out by so-called Joint validation teams. These teams include representatives from the government, state agencies, and international partners working in the natural resources sector. The teams assess the security situation at the site and its surroundings, as well as socio-economic risks such as child labour, depth of pits, presence of pregnant women and environmental issues.
- *Interference by armed groups* (e.g. illegal taxation, pillaging, forced labour etc.) may affect production volume, selling prices and even the number of workers.
- *State Services* may affect production volume and selling prices. Officially, only two states services are allowed to visit mining sites. The first one is the SAEMAPE (*Service d'Assistance et d'Encadrement à la Mine Artisanale et de Petite Echelle*). Its role is to support miners in the production (which can have a positive impact on production) and levy taxes (which impacts the selling price). The second one is the Mine Division (*Division des Mines*) and verifies that miners respect the mining code (*Code Minier*). Only the SAEMAPE is allowed to levy tax on mining sites. However, 24% of mining sites are visited by 2 state services, and 34% by 3 state services who come to levy taxes, which negatively impacts the selling price.²⁸ On the contrary, 14 % of the mining visited had not been visited by a state service.²⁹
- *Seasonality* affects production volume. On most mining sites, and especially those exploited underground and river shores and riverbed, the dry season is more productive because the ore is more accessible. In the rainy season, a lot of time is wasted in removing the water from the flooded pits, especially in pits close by a river; tunnels are inaccessible due the risk of landslide caused by the water. And for alluvial exploitation, riverbed is inaccessible.
- *World market prices* may affect selling prices on the ground.
- *Accessibility* of mining sites may affect selling prices.
- *Phone Coverage* may increase miners' access to information about current market prices and thus affect selling prices.
- The presence of *cooperatives* may affect the distribution model.
- The *actor that is responsible for the payment* may affect the distribution model.
- For each of these variables, we have verified (below) if it statically impacts the revenues of workers.

5.4.1. ITSCI vs Non-ITSCI mining sites

In line with findings from previous IPIS research³⁰, we did not find any **statistically significant difference³¹ in the generated value per worker between ITSCI and non-ITSCI mines ($p > 0.08$) while using IPIS database.**

Concerning the selling price, it appears that ITSCI mines sell their minerals at a higher price than non-ITSCI mines, and this observation is relevant for the cassiterite, the coltan and the wolframite (Figures 8, 9 and 10).

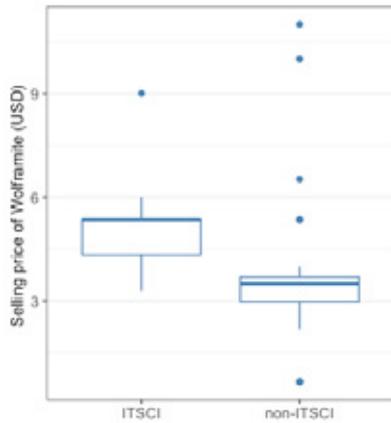


Figure 9: Selling price of wolframite on ITSCI and non-ITSCI mines (N = 85)

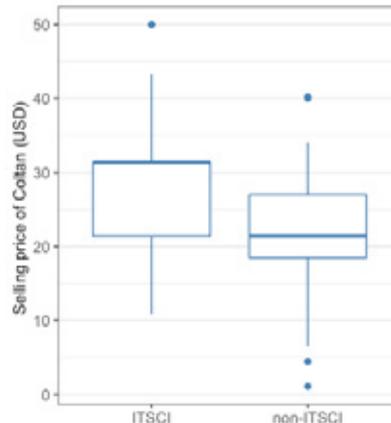


Figure 10: Selling price of coltan on ITSCI and non-ITSCI mines (N = 293)

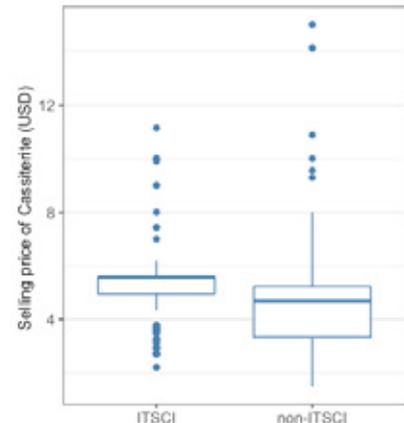


Figure 11: Selling price of cassiterite on ITSCI and non-ITSCI mines (N = 754)

It is possible that this higher selling price contributes to a better revenue for the miner. A previous research of IPIS determined that miners working on cassiterite mines covered by a due diligence programme (ITSCI in most of the case) were better paid (median: USD 12.94 per week) than their colleagues working in mining sites not covered by a due diligence programme (USD 11.1 per week). The same trend was found for the coltan, but not for gold, for which miners were better paid when they were not part of a due diligence system.³²

However, other researchers have found different results, that in some non-validated sites the local 3T prices are higher than at ITSCI sites (up to 1–1.5 USD/kg higher for cassiterite and up to 10–12 USD/kg higher for coltan), thus encouraging smuggling, including to neighbouring Rwanda where ITSCI levies are lower.³³

Arriving at different conclusions about mineral prices made by ITSCI and non-ITSCI depends on many variables such as the transport, the pre-financing, but also on the local context and the capacity of each actor to negotiate a price. This said, experts have criticised in articles and forums that it was the miners who were carrying the burden of the due diligence costs.³⁴ In fact, more research is needed to quantify and detail this due diligence cost.

5.4.2. The RCM certification of the mine

Figure 11 extracted from IPIS data shows that mining sites validated green or yellow by a ministerial qual-

32 IPIS/ULULA, "Assessing the impact of Due Diligence programmes in eastern DRC: A baseline Study", IPIS report, April 2019, p. 20.

33 C. Vogel, J. Musamba, B. Radley, A miner's canary in Eastern Congo: Formalisation of the 3T mining and precarious livelihood in South Kivu, The Extractive Industries and Societies, 2017, p. 77.

34 IPIS insights on Due Diligence in Mineral Sourcing, Regulating Responsible Sourcing of 3TG minerals, December 2019, p. 20. Can be found on : https://ipisresearch.be/wp-content/uploads/2020/01/201912_-_insights-Due-Diligence.pdf

ification have been selling their kilo of cassiterite for more than the same mineral produced in non-validated mines, on average USD 0.54. As the average price of the cassiterite between 2010 and 2018 turned around USD 5.18, it represents a difference of 10% on the selling price. This difference in selling price is statistically significant ($p < 0.001$).

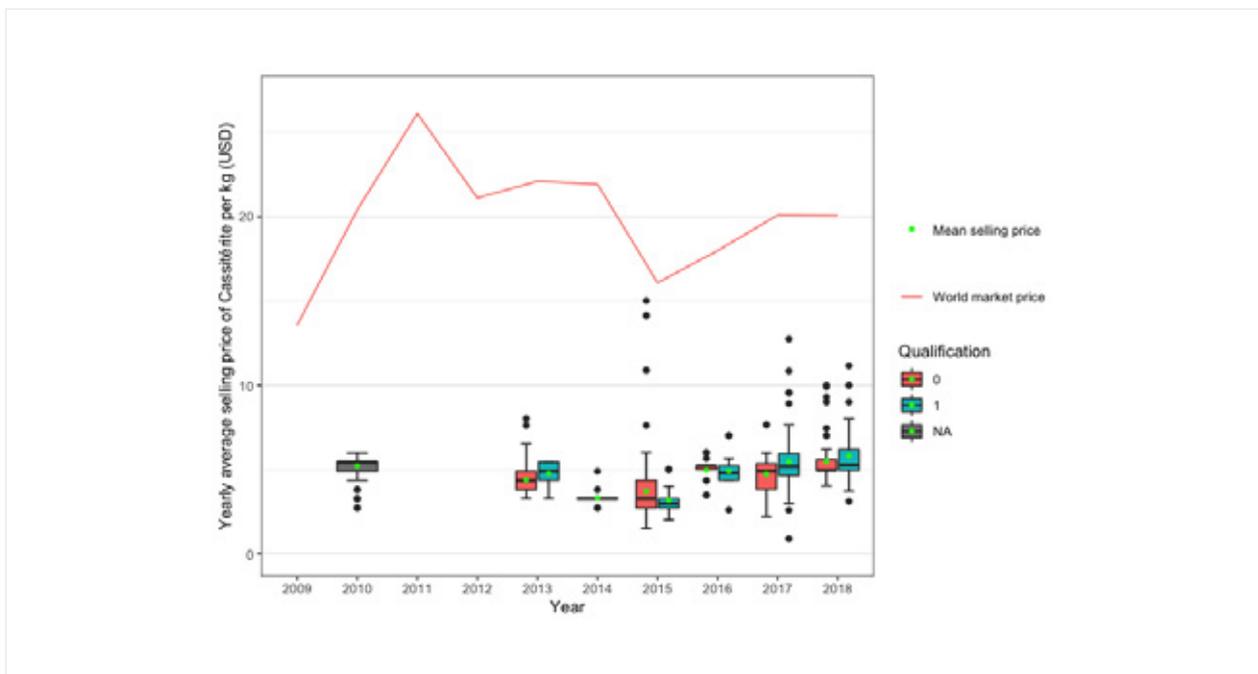


Figure 12: Yearly average selling price of Cassiterite per kg (USD) and by qualification status

There is no evidence that these 10% benefit the miners, as it may be the cost of the due diligence, which has just been mentioned in the section 5.4.1. Perhaps these 10% represents also the cost of transport, which can be expensive. However, as explained below (in section 5.4.8 on accessibility), remote areas sell their cassiterite cheaper than nearer areas from the selling point.

5.4.3. Interference by armed groups

Figure 12 below shows that there is **a significant difference between mining sites with and without interference by armed actors** with regard to the generated value per worker (the median is USD 37.3 and 24.1, $p < 0.01$). It is noteworthy to clarify here that the GVW is not the income of the miner, but an indicator of the productivity of a mining site. It is likely that armed groups target their activities of taxation and/or pillages on productive mining sites on which they know they will find numerous miners, and on the other side, small mining sites with low production are uninteresting for armed groups.

5.4.4. State Service

The **presence of state services cannot be associated with significant differences** in the generated value per worker ($p > 0.1$). The positive or negative impact of the presence of a state service on the miner's revenue entirely depends on the behaviour of the state agents. If they act negatively by illegal-

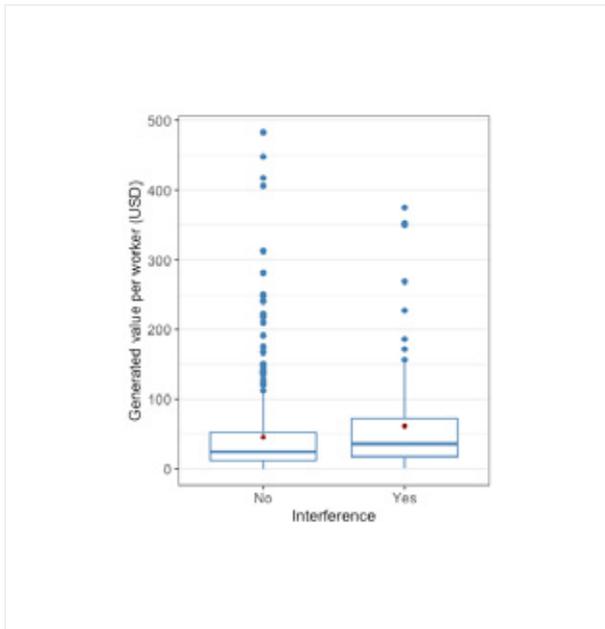


Figure 13: Generated value per workers on mining sites affected and not affected by interference from armed groups (the mean GVW are represented by the red dots)

season. **In the dry season, the median monthly payment is approximately 25 % higher than in the rainy season.**

ly taxing miners or being involved in stealing the production, miners will lose money. On the other hand, the presence of state services will facilitate the (legal) export of the minerals. But the impact of the state service presence on the miner’s revenue could not be demonstrated statistically.

5.4.5. Seasonality

Production is also affected by the season ($p < 0.001$). In South Kivu, the dry season starts in June until September, and the wet season is particularly strong from October to January, and in April-May.³⁵In the wet season, heavy rains flood the pits and slows down the work. Whereas miners work on average 9.9 hours a day in the dry season (6 days a week), in the rainy season, this average drops to 8 hours a day (again 6 days a week), during which time is spent to remove the rain water. While IPIS mining-site data does not allow to systematically compare production levels between the seasons, the individual-level data reveals that miners have a better salary in the dry season than in the wet

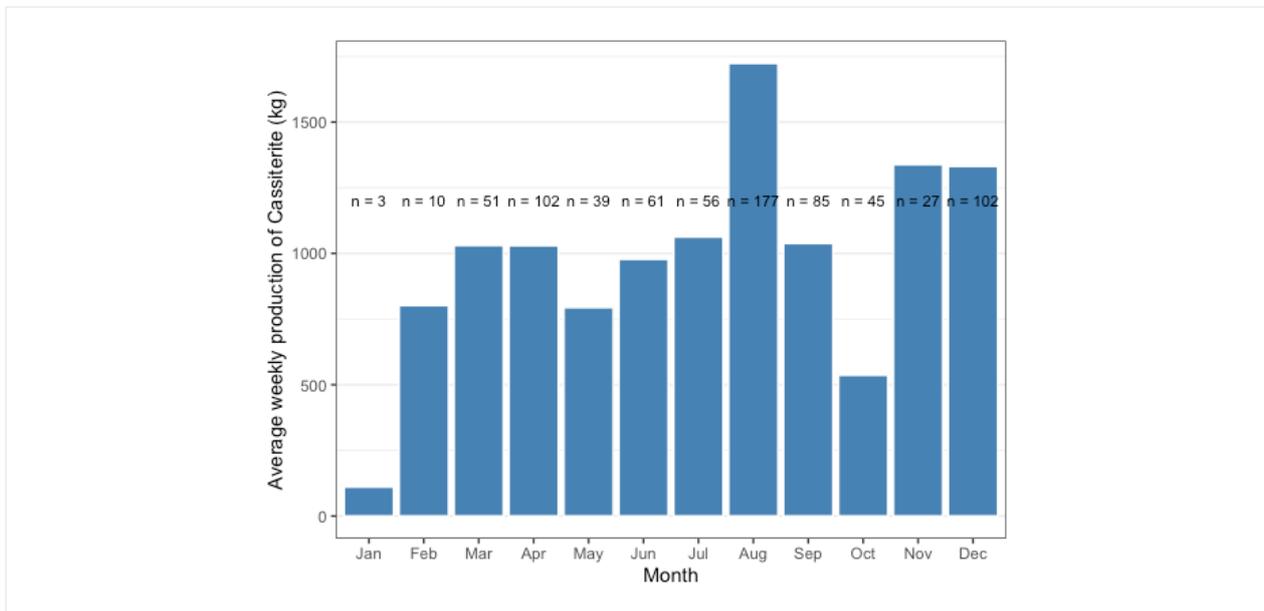


Figure 14: Average weekly production of cassiterite per month

35 <https://www.climatsetvoyages.com/climat/republique-democratique-congo>

5.4.6. World market prices

On average, an increase in the cassiterite world market price of 1 USD can be associated with an increase of the local selling price of USD 0.21 per kg. This correlation shows that some miners are aware of the world market prices. Figure 11 (in the Section 5.4.2 on RCM qualification) clearly shows that the price of the cassiterite on mining sites fluctuates accordingly the world market price of this mineral. Besides the phone (see section below 5.4.7 on phone coverage), there are other ways for the miners gather information about the world market price. This information can be shared word of mouth with buyers (*négociants*) or state agents.

5.4.7. Phone coverage

The selling price of the minerals are also statistically related to the phone coverage ($p < 0.001$). With phone coverage, miners and *négociants* are aware of the world market prices of the different minerals, which in turn affect the selling price on the site. For cassiterite, we observe a rise up to USD 0.66 when the world market price increases by one dollar.

5.4.8. Accessibility

Previous IPIS research has found that remote areas (i.e. more than 2 hours walking distance between the mine and the selling point) sell their minerals (gold, coltan and cassiterite) cheaper than those relatively close (less than 2 hours).³⁶ Similarly, we observe significant differences in selling price for cassiterite and coltan depending on the time of access to the mining site ($p < 0.001$). For instance, the selling price (per kg) of coltan tends to be USD 7.0 cheaper for the most remote sites. While it sounds counter intuitive, it is possible that nearer mining sites, both physically and through phone coverage, are more aware of the global market price, and therefore have more leverage in negotiating their price.

5.4.9. The presence of cooperatives

Nearly 20% (N = 93) of **miners in Itebero and Nzibira blame the presence of a cooperative³⁷ for the decreasing in their salary.** In Itebero, one cooperative takes 10% of the production and no one knows where this money goes. Therefore, only a minority of miners is a member of a cooperative, even when a cooperative is present on their mining site. Although data show that miners' share is higher (by 15.6 percentage points)³⁸ when the cooperative is absent³⁹, it is worth to be a member when at least one cooperative is present because members can keep a higher share of the generated-value than non-members (68.2 % instead of 35.8 %).

Discrepancy can come from the source of the data: individual-level data is more accurate than the aggregated mining-site-level data, but at the same time, the sample of the individual-level data may not be representative. Nevertheless, blaming the cooperative for the cut on the salary clearly shows that miners perceive the cooperatives in a negative way. In previous IPIS research, miners had also shared their discontent against the cooperative, criticizing mismanagement, lack of support, monopoly on the sales, and sometimes considering it as a tool to exploit them.⁴⁰ In conclusion, **the role of cooperatives for the miner's share remains unclear.**

5.4.10. Who is paying the miners

The **position occupied by the person who pays the workers seems also to have a strong impact on the share that workers receive.** According to the IPIS mining-site data, when the team chef (*chef d'équipe*) is responsible for the payment, the miner's share is 8.4 percentage points higher than when the pit chief (*chef de puit*) or the pit owner⁴¹ is responsible. The data collected in Itebero and Nzibira confirms this trend: miners that are paid by the team leader receive 27 percentage points more than the ones paid by the PDG or pit chief (they received 81.2 % instead of 54.1 % of the generated-value). In one case, the

miner even gets the entire share, after paying a fixed price rent to the PDG for the use of the pit. We can hypothesize that the pit chief being chosen by the PDG would claim a higher percentage for himself, whereas the team chief, despite being elected by the other miners, is not entitled to receive a higher share than the rest of the team members.



Miners working in a coltan mine, South Kivu

6. ANALYSIS OF BASIC NEEDS, SAVINGS AND INVESTMENT

6.1. Miners' basic needs

This section provides insight into costs and expenditures for artisanal miners to cover their households' basic needs, built on UNICEF's MEB of 2016, as described above.

In the following, each category of the MEB is described and its validity for an ASM context assessed, based on the field data. The goal is to provide an approximation of the expenditures required by miners to cover the items listed under each category. At the end, these expenditure needs are summarised into an adjusted (approximate) MEB for miners. This can then be compared with other figures, such as UNICEF's MEB, the DRC national minimum wage, or the national poverty line for rural areas. Also, it will serve for comparison with the miners' revenues and income.

The expenditure needs described below are always calculated on the level of a household, in order to follow UNICEF's MEB methodology. UNICEF calculates a MEB for small, average and large households, with the average household comprising of 5 members.

Based on the data from our small sample, the average household size for miners in this study is closer to 6 persons, 2-3 of which are children. Interestingly, 41% of miners also reported to have dependents elsewhere, not living with them in their current household. 3-4 persons was the average number of dependents outside the household. This finding indicates an even higher average size of a household for miners, as these dependents would also have basic needs to cover.

However, given that we mix calculations by UNICEF with our own calculations, we decided to keep the average household size of 5 to calculate the MEB for miners. The discrepancy with the actual household size is then considered in the conclusions, where we consider that the miners' MEB is likely to be at the lower end of needs, as on average, more household members need to be covered by it.

6.1.1. Food

To account for minimum food needs, the 2016 UNICEF MEB for DRC includes a few minimal food items such as staple crops, greens and vegetables, cooking oil and salt. For this study, we are largely using UNICEF's calculations, but have adapted the staple crops to what is most commonly eaten in the mining areas and have corroborated local prices for these staples. Price data of manioc, sorghum and maize is averaged out for the calculation of expenses needs, multiplied by the quantities for staple foods as per the UNICEF MEB.

We also collected data on the price of meat, even though meat is not included in the list of basic food items of the UNICEF MEB. Shopkeepers reported that on average, the price of 250 grams of meat can be 50% higher at a mine site than in the nearest town.⁴² This indicates that prices at mine sites can be higher for food items, and that this may mean miners have to spend more to cover their food needs than the general population in the towns.

The table below shows the calculation of expenditure needs for basic food items.

Table 9: Calculation of expenditure needs for basic food items

Source	Item	Average cost per item	Cost per month per average household (5 persons)	Assumption / explanation
IPIS study 2019	Staple crops (kg average across all 3 - manioc, sorghum and maize)	USD 1.00	USD 59.80	12 kg per person per month, as per UNICEF MEB quantity of staple foods
	Manioc (kg)	USD 0.41	USD 24.60	12 kg per person per month, as per UNICEF MEB quantity of staple foods
	Sorghum (kg)	USD 1.97	USD 118.20	12 kg per person per month, as per UNICEF MEB quantity of staple foods
	Maize (kg)	USD 0.61	USD 36.60	12 kg per person per month, as per UNICEF MEB quantity of staple foods
Additional items UNICEF MEB 2016	Vegetables	USD 0.70	USD 12.60	3.6 kg per person per month
	Cooking oil (kg)	USD 2.10	USD 9.45	0.9 kg per person per month
	Salt (kg)	USD 0.60	USD 0.45	0.15 kg per person per month
TOTALS:			USD 82.30	

significantly. Shopkeepers reported that on average, the kilo price of manioc had increased from USD 0.37 last year to USD 0.41, maize increased from USD 0.57 to USD 0.61 per kilo, whereas sorghum moved only minimally from USD 1.54 to USD 1.57 per kilo.

An approximate and average calculation of food expenditure need thus results in the following:

Table 10: Average monthly expenditure need

	Average monthly expenditure need (USD)
Staple crop	59.80
Vegetables (UNICEF MEB)	12.60
Cooking oil (UNICEF MEB)	9.45
Salt (UNICEF MEB)	0.45
TOTAL	82.30

6.1.2. Living expenses and household items

This category of expenditure needs includes the costs of necessary household items as well as the costs of living quarters, i.e. rent. The UNICEF MEB of 2016 does not include rent or housing costs, probably due to the assumption of a displacement situation where people would be living in displacement camps provided by humanitarian agencies.

In our study, only 24% of miners interviewed reported paying rent for their living quarters. On average, these miners pay 7.2 USD per month. Values range from USD 4.8 to 14.8 rent per month, but the data is inconclusive as to whether this is related to household size. The other 76% of miners reported paying

no rent. This likely means that they live in a shelter they built themselves, for which they have invested little, in order to be able to save more for themselves or their family, though this assumption could not be assessed in more detail. In rare cases, cooperatives cover for the food as well as the shelter of the miner, and provide some tools, as it has been observed at Bukumo. The cooperative pays this with its share of 20% that it is entitled to on the production.⁴³ This needs to be considered in discussions around miners' ability to cover minimum needs.

For the purpose of determining an approximation to expenditure needs for rent and living quarters, we have thus decided to include the miners' average rent spending of USD 7.2 per month.

With regards to the costs of household items, the study took the list of basic items from the UNICEF MEB of 2016 and attempted to corroborate local prices. The following table lists these basic items, providing the average local prices across all 5 marketplaces for some of them, while retaining the UNICEF price calculations of 2016 for other items that could not as easily be assessed locally but are considered part of the UNICEF MEB. This muddles the data slightly, as on the UNICEF items the prices are from 2016 and not as local and up to date as those assessed in this study.

Note that it is assumed that the UNICEF MEB assigns the full cost of an item to the expenses per month, as due to the emergency situation, the items have to be bought anew. Whereas in this table, the assumption is that each item has a replacement period which is often longer than one month.



Miners looking for cassiterite in Bamuguba mining site in South Kivu

Table 11: Calculation of expenditure needs for living expenses and household items

Source	Item	Average cost per item	Cost per month per average household (5 persons)	Assumption / explanation
IPIS study 2019	5 liter pan	USD 4.45	USD 0.37	Replacing it once a year.
	Kitchen knife	USD 0.88	USD 0.15	Replacing it twice a year.
	Bar of soap	USD 0.53	USD 2.65	One bar of soap per person per month.
	Mattress	USD 41.86	USD 2.91	Median costs, as data included costs of 0 instead of N/A. 1 mattress per 2 persons, replacing it every 3 years.
	Blanket	USD 4.33	USD 0.90	1 blanket per person, replacing it every 2 years.
	Pagne / cloth	USD 7.48	USD 1.56	1 pagne per 2 persons, replacing it once a year.
	Jerry can	USD 1.86	USD 0.31	2 per household, replacing them once a year.
	Washing bassin	USD 2.13	USD 0.18	1 per household, replacing it once a year.
	Bag of charcoal (60-80kg)	USD 6.07	USD 6.07	1 per month per household.
Additional items UNICEF MEB 2016	7 liter pan	USD 2.97	USD 0.25	1 per household, replacing it once a year.
	Mug	USD 0.37	USD 0.15	1 per person, replacing them once a year.
	Small spoon	USD 0.42	USD 0.35	1 per person, replacing them twice a year.
	Large spoon	USD 0.81	USD 0.14	1 per household, replacing it twice a year.
	Small bowl	USD 0.68	USD 0.17	3 per household, replacing them once a year.
	Big bowl	USD 0.89	USD 0.07	1 per household, replacing it once a year.
	Large bag	USD 0.88	USD 0.15	2 per household, replacing them once a year.
	Tarp	USD 9.94	USD 0.83	1 per household, replacing it once a year.
	Clothing items	USD 0.62	USD 0.51	2 pieces per person, replacing them once a year.
	Hygiene kit	USD 12.00	USD 1.00	1 per household, replacing every 2 months.
TOTALS:			USD 18.71	

The adapted list of household items thus amounts to expenditure needs of around USD 19 per month per average household of 5 persons. The UNICEF MEB of 2016 calculates a total of USD 86 per month and 5-person household. This difference may be explained by the assumption that the UNICEF MEB considers that all items need to be bought newly in an emergency or displacement situation, whereas the expenses calculated here assume that the items last for several months to a year and thus have a lower cost per month.

An approximate and average calculation of expenditure needs for living and household items for a 5-person household thus results in the following:

Table 12: Average of expenditure needs for living and household items

	Average monthly expenditure needs (USD)
Rent / living quarters	7.2
Household items	18.71
TOTAL	25.91

6.1.3. WASH

UNICEF calculates minimum expenditure needs for water, sanitation and hygiene (WASH) at USD 26 per month for an average household of 5 persons. This includes however not just the costs of access to the water, but also of building and maintaining latrines as well as water treatment tablets.

In our study, 94% of the respondents stated that they do not need to pay anything for access to water. Therefore, we have decided to use the UNICEF MEB calculations, but to deduct the cost of water itself, as in the mining areas this seems to be largely free. Of the USD 26 considered as minimum expenditure needs on WASH by UNICEF, USD 8 would be for the cost of water. Thus, we have decided to deduct this and use an amount of USD 18 per month and average household as an approximation of minimum expenditure needs.

An approximate and average calculation of WASH expenditure needs thus results in the following:

Table 13: Average of expenditure needs for WASH

	Average monthly expenditure needs (USD)
WASH as per UNICEF MEB but without costs for water itself	18
TOTAL	18

6.1.4. Education

The UNICEF MEB of 2016 stipulates that the educational expenses needed for an average household of 5 persons is USD 17 per month, including school fees and school materials. This would amount to USD 5.67 per child (if we assume 3 children in school for a 5-person household).

In this study, we have attempted to assess miners' educational expenditures in order to compare them with UNICEF's MEB and adapt it to the ASM context. Miners reported spending on average USD 1.91 per month per child on tuition fees.⁴⁴ That this amount is lower than the needs postulated by UNICEF could be explained by reports by the miners that primary education has been made free recently.⁴⁵ It is also interesting to note that 96 % of miners' children aged between 6 and 16 years old attend school, which is significantly high for North and South Kivu, where 30-44% of children have never been to school.⁴⁶ In addition, the data seems to imply a positive relationship between the spending on tuition fees and children in the household, with the expenditures increasing with more children.

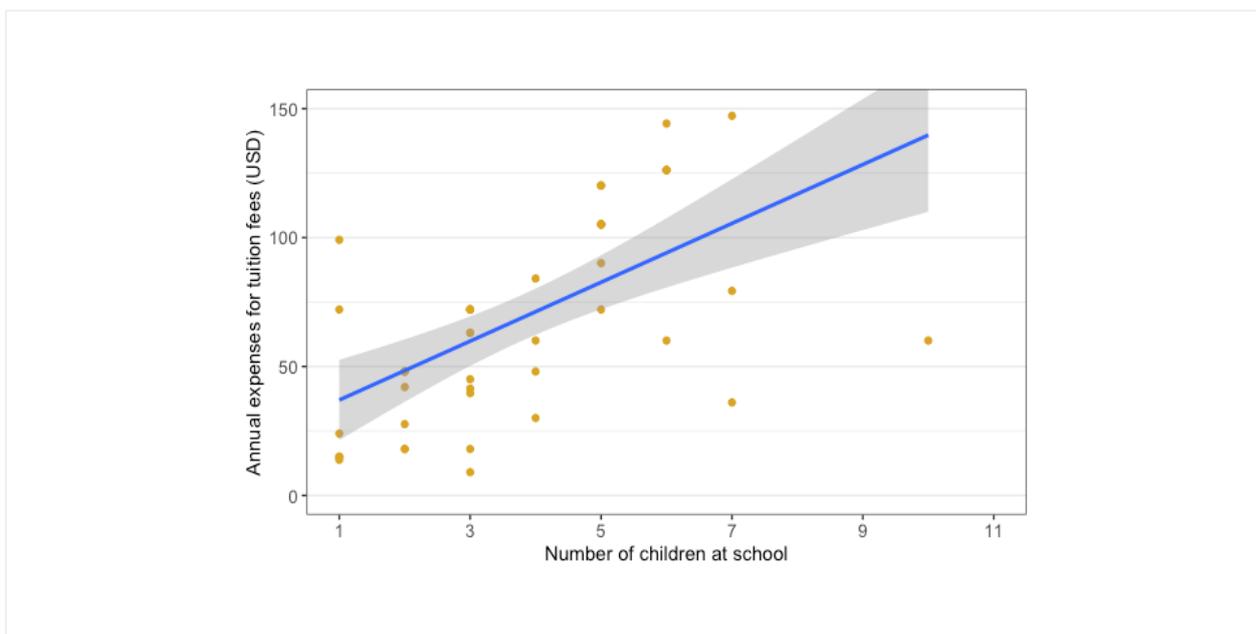


Figure 15: Number of children at school and annual expenses for tuition fees

This implies that the rate of education amongst miners’ children is high and it is prioritised by miners. Some miners report that despite the Government’s promise of free primary education, they attempt to save money for this purpose, as they do not seem to trust the promise and expect that they will eventually pay for school fees nevertheless.⁴⁷ This may also point to miners potentially needing to make informal payments to teachers or school authorities, but this assumption would need to be assessed further.

It is therefore difficult to draw any conclusions on minimum expenditure needs on education for miners’ households. While there may be no expenditures necessary for school fees if primary education becomes and stays free, expenditures would still be needed for school materials. The latter has not been assessed as part of this study but is included in the UNICEF MEB and amounts to 8 USD per month (2.66 USD per child) out of the total 17 USD in the MEB. We have therefore decided to use this amount as the minimum expenditure needs for miners.

An approximate and average calculation of educational expenditure needs thus results in the following:

Table 14: Average of expenditure needs for school materials

	Average monthly expenditure needs (USD)
School materials (based on UNICEF MEB)	8
TOTAL	8

6.1.5. Health

The UNICEF MEB considers the costs of ambulatory treatment at health posts and stationary treatment at hospitals as minimum expenditure needs. To understand what this could look like in a miners’ setting, we have asked miners how much they had spent in health-related expenditures for them and their family in the last 3 months. We also attempted to get a sense of costs for malaria treatments and for painkillers, as miners tend to use these frequently in order to be able to continue their backbreaking work.

While actual expenditures on health may not reflect minimum needs, it can give an indication of what miners tend to spend and how this compares with the minimum needs calculated by the UNICEF MEB.

In our study, 27% of respondents (N = 21) reported not having had any health-related expenditures for themselves or their families in the past 3 months. Of this group, 50% (11 out of 21) had no child, and for those who are parents, 80% (N = 10) had been paid for their work at the mines in the last month. Despite the small sample, we can therefore assume that most of the 27% who did not have health-related expenditures did not have health problem in the last 3 months, rather than not having been able to cover actual health needs. Of those 73% who reported health expenses, the large majority spent between USD 10 and 50 in the past 3 months, or between USD 3.3 and 16.6 USD per month. Figure 15 below shows that the majority of the miners interviewed had no expense related to health, and that most of the miners spent between USD 10 and 50 in the last 3 months.

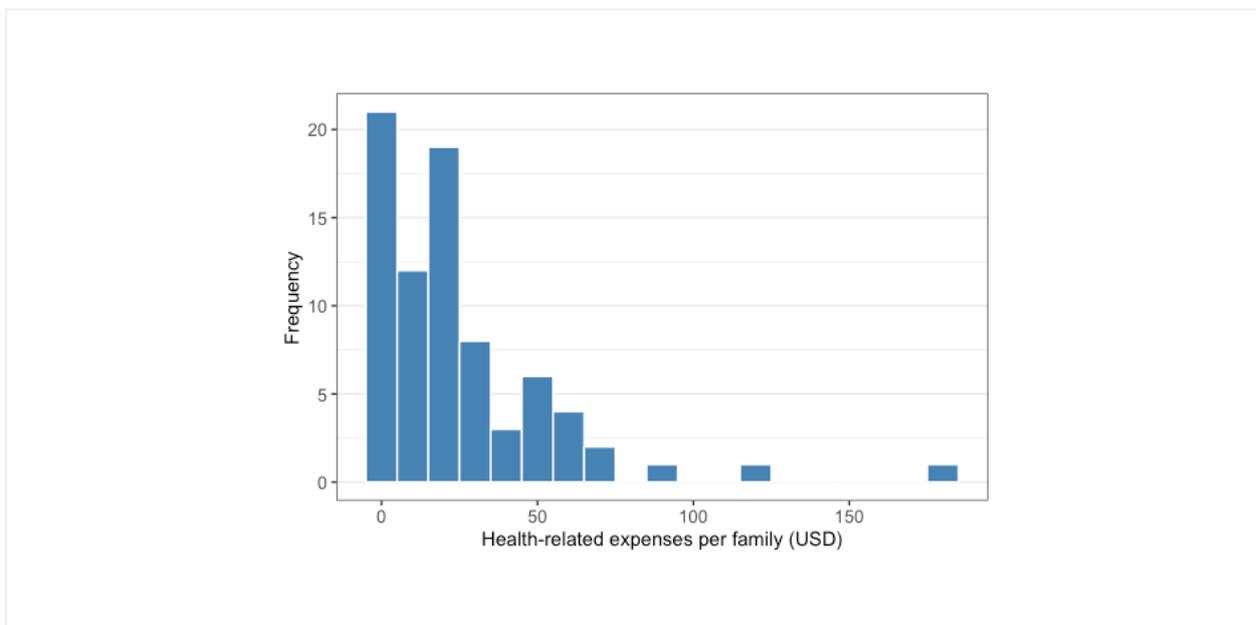


Figure 16: Expenses of the entire family at health facilities in the last 3 months

If we take the median value of the amounts the respondents spend on health, i.e. 5.61 USD per month per family, it falls below what UNICEF's MEB of 2016 estimates as monthly health related expense needs. The UNICEF minimum expenditure needs for health amount to 15 USD per month for an average household of 5 persons. This discrepancy could be related to several reasons:

- Miners may be unable to cover their minimum health needs and are thus spending less.
- Most of the miners live at the mining sites, which are often remote from the healthcare centres. Most of the mining sites in this study are 2 hours or more away from health care centers. Therefore, it may be that miners simply do not go to health centers, and may be more inclined to find local, more accessible and cheaper alternatives, e.g. self-medication.
- In general, gender norms often discourage men from seeking healthcare, who, instead, tend to self-medicate, which can explain the high use of painkillers (below).
- Health facilities usually target or prioritize children and women (maternity healthcare, health for children under 5). Therefore, it is possible that most of the health-related expenses are for relatives of the miners and so they may not always be aware of the actual health-spending.

For these reasons, we believe it is more cautious to include the amount calculated by UNICEF as a representation of a minimum expenditure need for health.

In our study, 73% of miners also reported spending money on painkillers. They spend an average of USD 4.16 on painkillers per month, again with a variation reaching from no expenses up to USD 18 per month. Local shopkeepers reported an average price of USD 0.33 per package of painkillers, which would mean miners (and potentially their families) consume on average 12 packages per month. This is a high quantity, but it is known that miners often suffer chronic pain. Miners work up to 8 hours a day, 6 days a

week, on average, and in more extreme conditions, spending 24 hours at a time inside an underground gallery.⁴⁸ As mentioned above, miners may prefer to self-medicate with pain killers as the access to health centers is difficult and expensive. Qualitative research showed that miners and their household misuse painkillers by taking it for every health problem. Furthermore, it should be mentioned that interviewees may have misunderstood the questions and interpreted the word “*antidouleurs*” as “*medicine*” in general. For the purpose of this study, we can assess that the amount budgeted for the painkillers is the same as the amount they would spend for the appropriate medicine.

This study also attempted to assess the costs of preventing and treating malaria, which is one of the most common infectious diseases in mining areas. According to the shopkeepers interviewed in the 5 marketplaces, a mosquito net costs an average of USD 1.28. Assuming the use of one mosquito net for two people⁴⁹, and the need to replace them once every 3 years⁵⁰, this would amount to a monthly expenditure of USD 0.08 per average household of 5 persons. In addition, based on information from the shopkeepers, the average cost for a package of antimalarial pills is USD 1.8. Given that the miners use antimalarial pills for treatment rather than prevention, we assume that a household of 5 persons may need one package every six months⁵¹, amounting to an expenditure of USD 0.3 per month.

The average calculation of health expenses thus follows the UNICEF MEB of 2016 and results in the following:

Table 15: Average of expenditure needs for health

	Average monthly expenditure needs (USD)
Health expenses at dispensaries and hospitals (UNICEF MEB)	15
Pain killers and other medicines	4.16
Mosquito nets	0.08
Antimalarial pills	0.3
TOTAL	19.54

6.1.6. Livelihoods

The UNICEF MEB focusses on agricultural livelihoods and includes tools, seeds and access to the land as expenditure needs under this category. We have attempted to adapt this to the livelihoods of miners. To determine expenditure needs for a miners’ livelihood, we considered the costs of basic tools and of access to a mine site. We did not include expenditure needs for agricultural livelihoods, as 63% of the miners stated to work at the mines all year.

In terms of mining tools, more than 50% of the interviewed miners stated that they owned an iron bar and a hammer. 35% of respondents own a basin, 21% own a pickaxe, whereas 10% reported not owning any tools. These are the most basic tools for workers or washers at the mine sites. Miners also reported that tools which are not owned by themselves are often owned by the mining team leader or the pit owner, or even more frequently, by other miners. This seems to imply that tools (and eventually costs) are shared.

Based on prices reported by local shopkeepers, the average costs of these tools were as follows:

Table 16: Average of costs of miner’s tools

Tool	Average local cost (USD)
Iron bar	14.05
Basin	2.4

Hammer	10.78
Pickaxe	9.78

To calculate minimum expenditure needs, we decided to include the two tools most commonly owned by miners themselves (iron bar and hammer). The washers would more frequently own a basin and potentially a hammer, but given that the costs of these are lower, we include the higher expenditure needs for the purpose of calculating the MEB. A majority of miners reported replacing their iron bar and their hammer on a yearly basis, thus their average costs are divided by 12 to arrive at an average monthly spending need for tools. This amounts to USD 1.17 for an iron bar and USD 0.90 for a hammer. Given that the average miner household in the study area has two persons working in the mining sector, this should be multiplied by two, thus giving a total of USD 4.14 per month for tools.

Livelihood costs could also include costs of accessing the land, but 96% of the respondents reported that they did not have to pay any additional access fees to the mine. Thus, this was not considered as an expenditure need. However, officially, every miner would need to hold a *carte de creuseur* to be allowed to work at a mining site. In previous research, IPIS showed that less than 10% of the miners actually hold one. In Itebero and Nzibira, approximately 16% (N = 1430) of miners held their *carte de creuseur*. For the calculation of the MEB, we assume that all miners are required to follow the law and that the costs of the *carte de creuseur* is an expenditure needed to gain access to a mine site. Therefore, we have included the '*carte de creuseur*', which (officially) costs USD 10 per year, USD 0.83 per month for a miner. If we consider that the average household has 2 persons working in the mining sector, the expenditure need comes to USD 1.66 per month and household.

To work legally on a mining site, each miner must also be a member of a cooperative and pay a membership fee. We also included this cost in our expenditure needs calculation. In Itebero and Nzibira, 73% (N = 93) of the interviewees declared to be a member of a cooperative. The annual cooperative membership in the studied area varies between USD 1.8 and USD 15, with an average of USD 4.34 (or USD 0.36 per month). Assuming again two miners per average household, this would amount to 0.72 USD per month.

An approximate and average calculation of livelihood expenditure needs thus results in the following:

Table 17: Average of expenditure needs for livelihoods

	Average monthly expenditure needs (USD)
Hammer + Iron bar	4.14
Carte de creuseur	1.66
Other access fees	0
Cooperative membership	0.72
TOTAL	6.52

6.1.7. Other needs

This study attempted to assess expenditures for 'other needs' such as costs of communication and leisure-related expenditures that may include going to bars or restaurants, for example. These expenses are not included in the UNICEF MEB but form a part of expenditures of artisanal miners in eastern DRC. In addition, calculations of a 'living wage' or 'living income' sometimes also include these categories.

With regards to communication expenditures, we took the costs of the cheapest mobile phone in the market and what the miners report regarding their average spending on phone credit. 72% of respondents in our study stated that they own a mobile phone, which is higher than the average Congolese

population, where in 2019 an estimated 50% had a mobile subscription.⁵² Therefore we take the assumption that the expenditure needs for an average household of 5 would be for 2 mobile phones. We estimated the expenditures needs for communication as follows:

Table 18: Average of expenditure needs for communication

Source	Item	Average cost per item	Cost per month per average household (5 persons)	Assumption / explanation
IPIS study 2019	Cheapest mobile phone in the market	\$ 16.42	\$ 0.91	2 per household, replacing them every three years.
	Average credit charged as reported by miners	\$ 0.51	\$ 8.16	Credit for 2 phones per household, assuming recharging this credit is needed twice a week.
TOTALS			\$ 9.07	

In terms of leisure-related expenditure, one fifth of miners reported spending no money on such items. A large majority of those who do spend money on leisure (78%) report spending between 5 and 15 USD per month. A view of the distribution of values across respondents is given below.

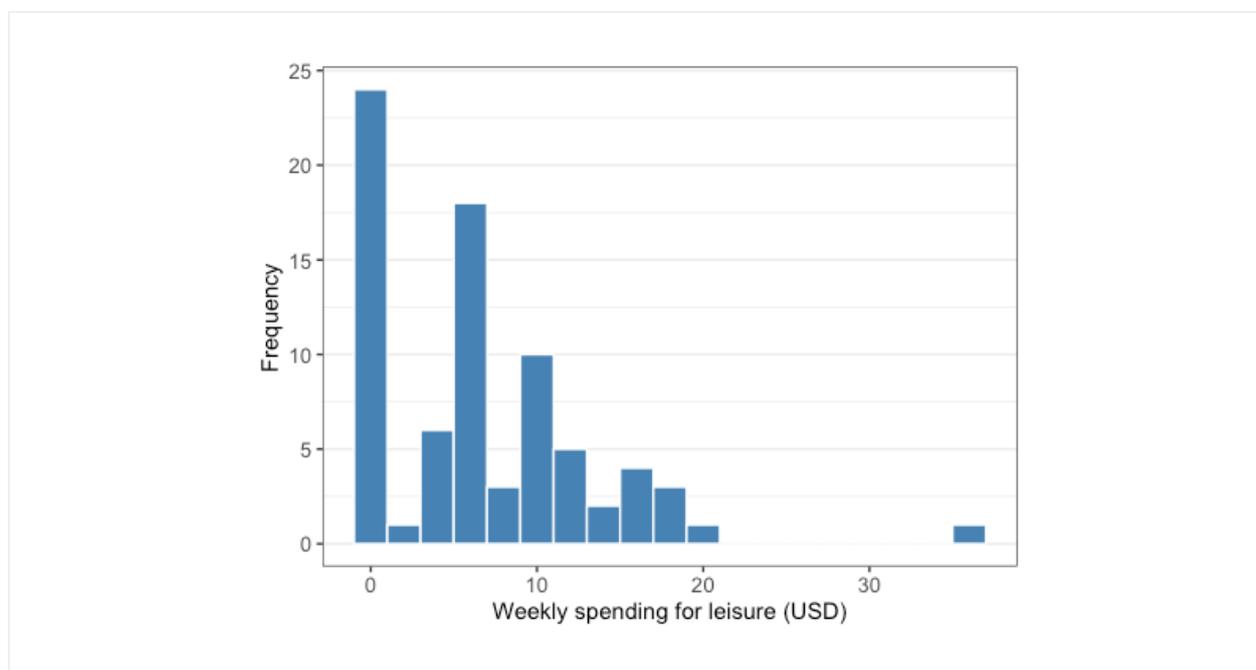


Figure 17: Amount of money (in USD) spent by miners on leisure

52 GSMA report 2019, cited in Hootsuite presentation : <https://fr.slideshare.net/DataReportal/digital-2019-democratic-republic-of-the-congo-january-2019-v01>

For the purpose of the MEB calculation, we accounted for the fact that a fifth of the miners does not have expenditures on leisure, and that there are outliers above USD 18 per week. We thus took the median of the respondents laying within the range of USD 1-18 per week, which was USD 6.01. This amounts to USD 24 per month.

An approximate and average calculation of expenses needs for communication and leisure thus results in the following:

Table 19: Average of expenditure needs for other needs

	Average monthly expenditure needs (USD)
Communication	9.07
Leisure	24
TOTAL	33.07

6.1.8. Debts and savings

Expenses for debt repayment and savings are not included in the UNICEF MEB of 2016, but, like communication and leisure, form an essential part of expenditures of artisanal miners in eastern DRC. Calculations of a 'living wage' or 'living income' sometimes also include categories to account for a certain amount of savings, as well as financial payments such as social security, taxes, and debts, since these expenditures are considered to be part of being able to lead a decent life.

In addition, the ability to save and re-invest income is a crucial feature of social and economic development. Only if miners are able to save money will they be able to re-invest it in their families, communities, local economy and the mining business. Therefore, we have decided to include an approximation for minimum expenditure needs on debts and savings in this study as well. However, the ability to save does not translate automatically into the ability to re-invest, and the barriers miners face in reinvesting their savings need to be explored further.

We base our consideration of minimum expenditure needs for debt and savings on an assessment of the actual expenditures as reported by miners themselves.

6.1.8.1. Debt

With regards to debt repayment, 53% (N = 93) of the miners reported to not have any debts, while 47% are in debt. Of those being in debt, the large majority (81%) reported this to be in relation to mining activities. Most of these (76%) have to repay debt in cash, but some also in minerals (23%). Those with mining-unrelated debts have to repay in cash. On average, miners report having to pay USD 16 for debt repayments per month. However, the median value is USD 10, which gives a more accurate picture considering the distribution of values: Around 73% of respondents with debts report between USD 2 and 20 of debt payments per month, whereas the remaining part report outlying amounts between USD 25 and 72 per month. Figure 17 below gives an overview of the distribution of values across respondents.

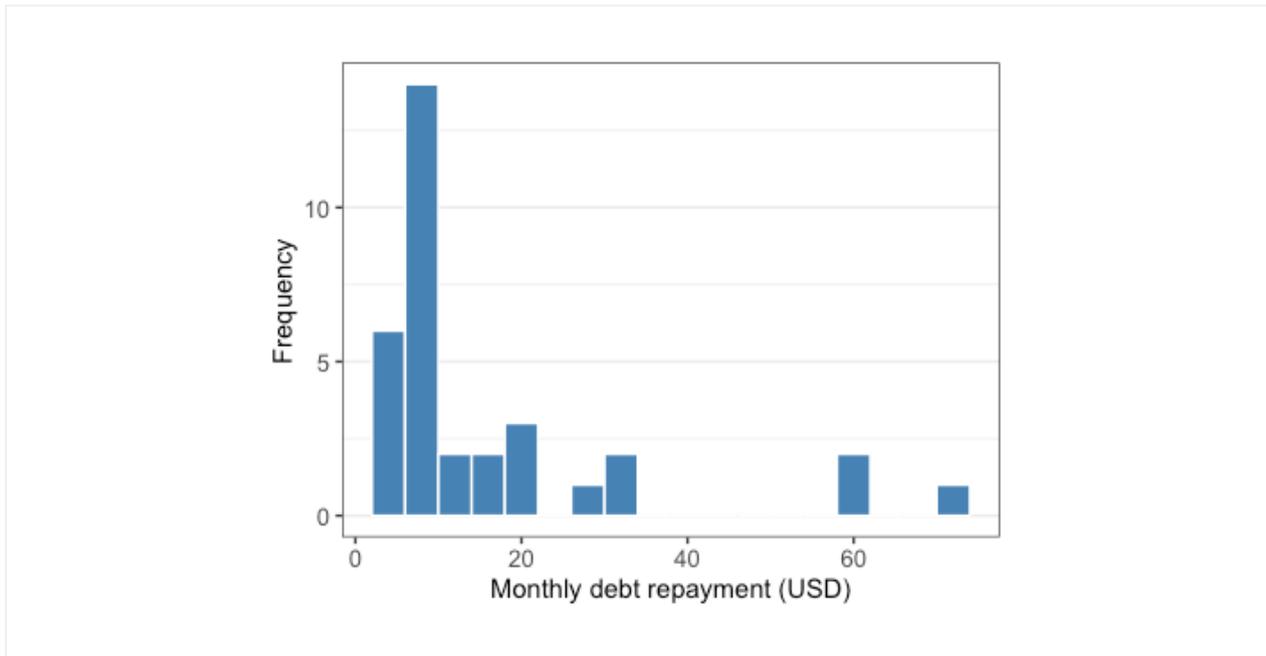


Figure 18: Amount of money (in USD) spent by miners on debt reimbursement per month.

Considering that half of the miners report not having any debts, this needs to be reflected in our estimation of minimum expenditure needs for debt payments. If we take an average across all respondents, and remove the outliers (above USD 60), we arrive at an average debt repayment of USD 4.72 per miner per month. We take this as an approximation for the calculation of minimum needs.

6.1.8.2. Savings

Of the miners interviewed, 31% are able to save money whereas 69% have no savings. For those who are able to save, the average monthly savings amount to USD 13. There is a range of reported savings ranging from USD 0.6 USD to 30 per month, though relatively evenly distributed across respondents (median value of USD 10.52). If we include those unable to save money into the calculation of an average amount, we arrive at an amount of USD 4 monthly savings, which we use as an approximation for the calculation of minimum needs.

Interestingly, around 15% of respondents report having debts and being able to save at the same time. This is 50% of those who are able to save. Conversely, 37% of respondents have neither savings nor debts. Comparing those who are able to save with those who have debt, it can be noted that the size of the household seems to be related to the ability to save, with larger households being slightly less able to save money. However, having higher health or educational expenses does not appear to be linked to the ability to save.

Also, a third of those who are diggers can save money, but only one fifth of the washers is able to do the same. Cooperative membership might also be linked, with 50% of those without cooperative membership being able to save money, whereas only a third of cooperative members can save money. Additional qualitative research is needed to determine the reasons for this. These factors are likely only a small selection of factors that potentially affect miners' ability to save, but within the scope of this study we were not able to make any more robust claims.

An approximate and average calculation of expenditure needs for debts and savings thus results in the following:

Table 20: Average of monthly expenditure needs in debts and savings (in USD)

	Average monthly expenditure needs (USD)
Debts	4.72
Savings	4
TOTAL	8.72

6.2. Summary: Expenditures needed to cover basic needs

Based on the above, an approximation of minimum expenditure needs for miners and their household is made. The following table provides a summary of these expenditure needs per month for an average household of 5 persons:

Table 21: Expenditure needs per month and average household of 5 persons (in USD)

Expenditure category	Expenditure needs per month and average household of 5 persons (in USD)
Food	82.30
Living expenses and household items	25.91
WASH	18.00
Education	8.00
Health	19.54
Livelihoods	6.52
Other needs	33.03
Debts and savings	8.72
TOTAL	202.02

This would amount to minimum expenditure needs of **USD 40.51 per person per month, or USD 1.33 per person per day**. It needs to be noted that this figure covers a household of 5 persons. Considering that miners covered by this study on average have a larger household size and also dependents outside their household, minimum expenditure needs might be closer to **USD 243.06 per month for a 6 person household**, or USD 324.08 for an 8 person household.

This compares to other relevant benchmarks as follows:



Wolframite mine in Mulamba, South Kivu

Table 22: Miner's revenue, DRC minimum wages and poverty lines in comparison with basic needs of households of 5, 6 and 8 persons

	Base	5-person Household	6-person Household	8-person Household
MEB for miners	Calculations above	USD 202 per month	USD 243 per month ⁵³	USD 324 per month ⁵⁴
UNICEF MEB for DRC (2016)	UNICEF MEB 2016	USD 245 per month	USD 294 per month ⁵⁵	USD 392 per month ⁵⁶
DRC National Minimum Wage (Salaire Minimum Interprofessionnel Garanti - SMIG)	The SMIG currently stands at FC 7.075 per day for manual labour. ⁵⁷ This amounts to approximately USD 4.25 per day at the current exchange rate, which would be USD 85 per month if working full time.	USD 160 per month (if we assume 2 persons working full time in the HH)	USD 160 per month (if we assume 2 persons working full time in the HH)	USD 160 per month (if we assume 2 persons working full time in the HH)
International Poverty Line (World Bank)	USD 1.90 per person per day	USD 290 per month ⁵⁸	USD 347 per month ⁵⁹	USD 464 per month ⁶⁰
DRC National Poverty Line	The only data available is from 2006, when the national poverty line was set at FC 153,265 per person per year in an urban setting and at FC 97,655 per person per year in a rural setting. ⁶¹ This would amount to FC 8,138 per month in rural settings (or USD 4.89 using the current exchange rate) - or USD 0.6 per person per day.	USD 24.50 per month ⁶²	USD 29 per month ⁶³	USD 39 per month ⁶⁴
Miners' revenues	A miner's revenue is estimated at between USD 84.37 and USDD 115 per month if we take the median value found in this study.		USD 202 per month for a household where the mother and the father are miners. (See section 6.2.1 Comparison with miner's revenues)	

53 Derived value from the 5-person household value.

54 Derived value from the 5-person household value.

55 Derived value from the 5-person household value.

56 Derived value from the 5-person household value.

57 <https://www.congo-autrement.com/blog/rdc-salaire-a-partir-du-1er-janvier-2018-le-smig-passe-de-1-680-fc-a-7-075-fc-par-jour.html>

58 Value derived from the base.

59 Value derived from the base.

60 Value derived from the base.

61 [http://siteresources.worldbank.org/INTPRS1/Resources/Democratic-Rep-of-Congo-French\(July2006\).pdf](http://siteresources.worldbank.org/INTPRS1/Resources/Democratic-Rep-of-Congo-French(July2006).pdf)

62 Value derived from the base.

63 Value derived from the base.

64 Value derived from the base.

6.2.1. Comparison with miner's revenues

In section 3.2.3, we calculate that the weekly salary of men is USD 29.44 and of women is USD 21.03 in Itebero and Nzibira. Assuming that they are the father and the mother, and therefore that they are paid according to their sex, this household earns approximately USD 202 per month. A household in which both miners are from the same sex, and both would earn an adult salary, the household with male miners would make USD 235.5, and of women USD 168.24. Considering the sociological and gender norms in Eastern DRC, it is more likely that breadwinners in a household would be a father and a mother.

Comparing this amount of USD 202 to monthly minimum expenditure needs of 243 USD, it implies that miners' families and household have difficulties to make ends meet. In the case of a single breadwinner household, the gap between his/her revenue and the basic needs costs is evidently greater and seems unreachable, as the median of the miner's salary represents even less than half of the basic needs.

A miners' median revenue of approximately USD 71.37 to USD 86 monthly is however much above the rural poverty line of DRC, both on an individual level (USD 4.89 per month) as on the level of a 5-person household (USD 24). It is also higher than the World Bank's poverty line on an individual level (USD 58 per month), though not on the level of a 5-person household (289 USD per month). The DRC minimum wage at the individual level (USD 85 per month) actually fits in the median estimated miner's revenue fork of USD 71.37 to 86. For a household of 2 persons working full time, the minimum wage equals USD 160 per month, which is below the USD 202 monthly salary of a household of miners with one man and one woman working.

This implies that in general, miners' ability to cover basic needs is better and their revenue higher when compared to the general population of DRC, where in 2018, 73% of the population lived below the extreme poverty line of USD 1.90 per day per person.⁶⁵ As per the numbers above, a miners' daily income would be between USD 2.7 and 3.3, if we take the weekly median of USD 16.47 and USD 19.84 and assume 6 work days per week. Of course, this needs to be considered in the context of seasonality over the course of a year, where not each week may be as productive.



Miners extracting cassiterite in Ishanga, South Kivu

7. CONCLUSION

According to IPIS data from 2016 and 2018, most of **3T miners in Eastern Congo earn around USD 2.7 and USD 3.3 per day, or between USD 71.37 and USD 86 per month.**

In the studied areas of Nzibira (South Kivu) and Itebero (North Kivu), most miners make **between USD 3.2 and USD 4.4 per day, or between USD 84.37 and USD 115 (median) per month.** When taking the revenues difference between men and women into consideration, **a household in which the father and the mother are the miners, their joint revenue is approximately USD 202 per month.**

As seen in the present report, most of the households around Itebero and Nzibira are composed of 6 people, the costs of their **basic needs are estimated at around USD 243 per month.** Noticing this figure, it becomes clear that a household with only one breadwinner, which is the case for most of the families in Itebero and Nzibira, has evident difficulties to meet ends at the end of the month. Indeed, **the breadwinner income does not cover half of the basic need costs.**

In the case where there are two miners in the household of 6 people, the family could still not meet the ends unless they cut on spending money for leisure and making savings. The provincial measure for the school gratuity has been welcomed by the families as it relieves them from an important cost. However, the qualitative research has also demonstrated that the miners were still saving money for education in case of the cancellation of the school gratuity measure.

In the case where there are two breadwinners, but one is active in agriculture, which is the most common income generating activity in Eastern DRC, the joint income would also not be sufficient for the basic needs. The rural poverty line in DRC equals an average of USD 4.89 a month. This last figure also demonstrates that mining is **actually a well-paid activity, in comparison with others income generating activities, and yet, it does not cover the basic needs.**

However, it is important to emphasize that the estimations found in this study must be analysed cautiously. **The present study has demonstrated the complexity to identify with certainty the barriers affecting the miner's revenue.** The informality of the artisanal mining sector renders nearly every mining site reality "unique", in which the behaviour of the present actors, such as the armed groups, the cooperatives, the state agents, is unpredictable. In the case of a cooperative for example, it remains unclear if it is in the miner's advantage to be member or not because they all act differently: the membership fee differs from one to another, some claim a share on the generated value (sometimes 10%, sometimes 20%), others do not, some provide shelter, food and tools, others provide nothing.

Previous IPIS research estimates that the national army, the *Force Armée de la RDC (FARDC)* is the most present armed actor at mining sites.⁶⁶ However, the behaviour varies greatly between those undisciplined elements levying taxes, and those providing protection. And a greyer zone exists when the FARDC provides protection but the mining community is willing to pay a fee so the unpaid soldiers can live, as it is the case in Nzibira. In this specific case, miner communities pay a monthly fee of 50 000 FC to the FARDC but is grateful for the military protection that it provides.

Other variables such as the payment modalities have an impact on the miner's revenue and are subject to local particularities. The present study has shown that miners were earning a better income when they were paid by their team leader rather than by their pit chief. It also demonstrated that miners can be paid in cash, in-kind or in other local systems.

It is a fact that artisanal miners will only join the formal supply chain if they find a benefit that the informal sector cannot provide. And what international downstream actors can offer is a constant and sizeable demand of minerals paid at the world market price. On the other hand, downstream actors, and more specifically companies at the very end of the supply chain, want to make sure that purchasing minerals extracted in DRC will not bring them bad publicity by naming them as a company that violates human rights and/ or finance conflicts. Therefore, there is a need to establish a transparent and fair supply chain that is capable to meet the demand of the international buyers.

The recommendations below are written with the objective to increase the miner's revenue, but can involve or require actions from the state authorities, as well as from the downstream actors and interna-

tional partners.

In order to fill this gap, measures and programmes should be set up with the objective to increase the miner's revenue.

7.1. Recommendations

A first set of recommendations is meant to **ensure access to responsible markets** to artisanal miners:

- Promote and sustain due diligence and traceability programmes in order to increase the offer of "fair" minerals for downstream actors.
- Downstream actors are already showing demands for more "conflict-free" minerals from DRC but the supply does not follow. Therefore, state authorities and international partners should work to extend scope of the responsible sourcing. Significant larger areas need to be established for responsible sourcing. In theory, entire territories could be considered to be free from armed interference, but validation visits do not take place. This geographic extension should come with several measures such as establishment of new ZEAs (Artisanal Exploitation Zone). Extending the responsible sourcing to make it easier for artisanal miners and traders to bring their production in the formal supply chain also means to increase the number of registered trading houses. In some areas, in compliance with the OECD criteria, it is nearly impossible to sell minerals legally due to the absence of legal trading houses. One way to facilitate the creation of trading houses and increasing the responsible sourcing is to decentralize the competence of establishing a ZEA, a cooperative and trading house at the provincial level.
- Disengaging from Conflict Affected and High-Risk Areas (CAHRAs) is not encouraged by the OECD guideline. The *de facto* embargo on Congolese minerals preceding the vote of the Dodd-Frank act led to an economic catastrophe in the mining areas. Instead, **IPIS recommends downstream actors to proceed with purchases under conditions and/or risk mitigation actions in with due diligence guideline**, which includes due diligence programmes. Therefore, **IPIS recommends to promote and sustain the due diligence programmes in order to augment the supply** of "verified" minerals coming from CAHRA.
- Consequently, IPIS encourages the implementation of other traceability and due diligence programmes. Today, the ITSCI programme largely dominates the DRC mining sites at such a level that it benefits from a monopsony situation, in which, miners can only sell 3T minerals to ITSCI if they want to enter in the legal supply chain. More options would accelerate and facilitate the access to a legal supply chain, but also give more power to artisanal miners to negotiate the value of their production, the selling price having a demonstrated important influence on their revenue.
- The present study has not demonstrated undoubtedly that miners would be better off if they sold their minerals following the legal supply chain. It is crucial that **due diligence programmes buy the minerals at a competitive price to convince miners to integrate the legal supply chain.**

A second set of recommendations specifically target policy and measure that will have an impact to **improve the miner's revenue.**

- **Improve access to finance:** Assisting miners or cooperatives to access transparent and formal loans or credit schemes to acquire material that will improve the productivity of the mine. Increasing productivity by supporting small mechanisation, such as motor pumps in the case of Itebero and Nzibira, could lead to an increase of the production that will generate more revenue.
- **Improve the structures and governance of cooperatives:** The role, the power and the prerogatives of the cooperative should be improved to allow for more participation in decision making by miners and workers, and more democratic structures. This study has shown that it was unclear whether a cooperative had a positive or a negative effect on the miner's revenue. Ideally, a cooperative could finance itself through a tax on the production and use the fund to invest in miner's security or more effective material. Industry actors could raise awareness and work in an industry coalition, together with

the Congolese state to ensure that cooperative structures are fairer and more beneficial for workers, and especially women, who earn less than men.

- **Reduce corruption and informal taxation:** Work with the Government and state authorities to reduce corruption and informal taxation in mineral chains overall. This could involve making sure state agents are paid appropriate salaries and introducing checks and balances to prevent corrupt practices.
- **Support gender equality in ASM,** and working towards better revenues and better positions or roles for women working in the sector by increasing their voice and involvement in decision making.
- **Support the provision of and access to social security and health care services** to mining communities and the general population, as this amounts to a significant share of their expenditures and would free up income to be used for other needs.
- The report showed that an increase of USD 1 on the cassiterite world market price was translated by an augmentation of USD 0.66. Furthermore, the price of minerals (coltan, cassiterite or wolframite) is higher on close mining than remote mining sites, likely because miners are aware of the world market price. Therefore, **information related to the world market price should be made available to miners** in order to strengthen their bargain capacity for higher price, which will result in a higher income.

A third set of recommendations focuses on the need for more research on the miner's revenue and the (non-)development of the artisanal mining areas.

- Further research integrating a larger and randomized sample of mining sites and miners is needed to identify with a stronger certainty the barriers affecting the miner's revenue. The same research should also investigate at a larger scale the prices of the basic needs and the expenditures in mining communities
- Further research is needed to understand how miners spend the revenue they earn from mining, and whether or not they are able to spend it on the improvement of their and their families' lives, and the development of their communities as a whole. This research would need to understand the barriers for miners to spending money in a 'developmental' way, for example the (in-)ability to save money, the (in-)accessibility of public services (health, education, electricity, roads, etc). If revenues from mining and mineral trade are to lead to developmental outcomes, we not only need to understand the barriers to revenues for miners (which this report focuses on), but also the barriers to spend these revenues in a beneficial manner.



Workers in Cassiterite mine in South Kivu

8. ANNEXES

8.1. UNICEF MEB for DRC, 2016

The MEB contained the following items, quantities and prices (for which an exchange rate of USD 1 USD = FC 940 was used at the time):

Categorie et Items	Prix (USD)	Unité	A Quantite	B Quantite	C Quantite	A-Dépenses Total (USD)	B-Dépenses Total (USD)	C-Dépenses Total (USD)	Temporalité
Sécurité Alimentaire						30	65	103	
Céréales (Farin Mais ou Riz)	0.7	Kg	27.6	60	96	19	42	67	Mensuelle
Légumineuses (Haricot)	0.7	Kg	8.28	18	28.8	6	13	20	Mensuelle
Huile	2.1	Kg	2.07	4.5	7.2	4	9	15	Mensuelle
Sel	0.6	Kg	0.35	0.75	1.20	0	0	1	Mensuelle
AME						71	86	151	
Casserole 5 l	2.86	pcs	1	1	1	3	3	3	Semestrielle
Casserole 7 l	2.97	pcs	1	1	2	3	3	6	Semestrielle
Tasse inox 0.35 l	0.37	pcs	3	5	8	1	2	3	Semestrielle
Cuillère inox	0.42	pcs	3	5	8	1	2	3	Semestrielle
Bol inox non magnetique 24 cm	0.68	pcs	1	3	3	1	2	2	Semestrielle
Bol inox non magnetique 28 cm	0.89	pcs	1	1	2	1	1	2	Semestrielle
Cuillère cuisine	0.81	pcs	1	1	1	1	1	1	Semestrielle
Couteau cuisine	0.24	pcs	1	1	1	0	0	0	Semestrielle
Savon de lessive et hygiene, (450gr personne/mois)	0.0011	gr	1350	2250	3600	1	2	4	Mensuelle
Couverture	2.79	pcs	2	3	5	6	8	14	Semestrielle
Sac polypropylene, 90 kgs capacite, taille 74x116cm	0.88	pcs	2	2	2	2	2	2	Semestrielle
Pagne, 100% coton, wax 6 yards	12	pcs	1	1	2	12	12	24	Semestrielle
Bidon rigide, 20 l	3.95	pcs	1	1	2	4	4	8	Semestrielle
Bache 4x5 m	9.94	pcs	1	1	2	10	10	20	Semestrielle
Moustiquaire, ln, 110-150d, w/b/g 190x180x150cmlxwxh	4.95	pcs	1	2	3	5	10	15	Semestrielle
Bassine de lavage en plastique (ronde) 22 litres	1.8	pcs	1	1	2	2	2	4	Semestrielle

friperies 2 piece par personne	0.617222	pcs	6	10	16	4	6	10	Semestrielle
Kit hygiene intime	12	pcs	1	1	2	12	12	24	Semestrielle
Natte	1.39	pcs	2	3	5	3	4	7	Semestrielle
WASH						18	26	35	
Kit Assainissement (creusage latrines et entretien)	10.64	pcs	1	1	1	11	11	11	Annuelle
Payement de l'eau		bidon	69	150	240	4	8	13	Mensuelle
Produit de Traitement d'eau (Aquatab)	0.05	comprimé	69	150	240	3	8	12	Mensuelle
Education						9	17	26	
Frais Scolaires	4.5	Trimestre	1	2	3	5	9	14	Trimestrielle
Uniforme		Pièce complet	1	2	3	0	0	0	Annuelle
Matériels Scolaires	4	Trimestre	1	2	3	4	8	12	Trimestrielle
Santé						8	15	23	
Utilisation service PMA + intrants (soins en ambulatoire au CS)	7.5	Coût de la prise en charge du palu simple en ambulatoire	1	2	3	8	15	23	Pour 4 mois (trois épisodes par an)
Utilisation service PCA + intrants (Hospitalisation)		Coût de l'épisode de Paludisme grave qui est le plus fréquent	1	2	3	0	0	0	Pour 4 mois (trois épisodes par an)
Moyens de Subsistance						36	36	36	
Houes	3	Tête	1	1	1	3	3	3	Annuelle
10 kg semences vivriers	10	unité	1	1	1	10	10	10	Annuelle
50 g semences maraichers	3	unité	1	1	1	3	3	3	Annuelle
Accès à la terre (location ou metayage)	20	Demi Ha	1	1	1	20	20	20	Annuelle
Total						170	245	373	

Amounting to the following totals:

Minimum Expenditure Basket (dimensionnement taille menage trois cohorts A,B,C)		
Sécurité Alimentaire		
\$29.67	\$64.50	\$103.20
AME		
\$70.77	\$86.30	\$150.72
Education		
\$8.50	\$17.00	\$25.50
WASH		
\$17.76	\$26.12	\$35.41
Santé		
\$7.50	\$15.00	\$22.50
Moyens de Subsistance		
\$36.00	\$36.00	\$36.00
Menage A	Menage B	Menage C
\$ 170	\$ 245	\$ 373



Miners taking a break in Zola Zola"

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

