

# The Mutoshi Pilot Project

Local economic impact of a project aimed at formalizing artisanal and small-scale mining.

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## Abbreviations

<b>AM</b>	Artisanal miner
<b>ASM</b>	Artisanal and small-scale mining
<b>CDF</b>	Congolese Franc
<b>DRC</b>	Democratic Republic of the Congo
<b>FGD</b>	Focus group discussion
<b>KII</b>	Key informant interview
<b>NGO</b>	Non-governmental organization
<b>SAEMAPE</b>	Service for Assistance and Supervision of Artisanal and Small-Scale Mining

Exchange rate: 1 CDF = US\$0.0006 (value 01/01/2019).

Source: <https://www1.oanda.com/currency/converter/>.

## Acknowledgements and disclaimer

This report was commissioned by the Trafigura Group and prepared by Sara Johansson de Silva, Tove Strauss, and Nene Morisho. The findings and recommendations represent the views of the authors and should not be attributed to the Trafigura Group.

## The authors

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## Foreword from Trafigura

Switching from fossil fuels to electrified transportation is a core strategy in the global effort to combat climate change. The resulting demand surge for cobalt required in the production of batteries is piling pressure on a vulnerable supply chain.

Two thirds of global cobalt production originates from the Democratic Republic of the Congo (DRC). A significant volume of that output is produced by the artisanal small-scale mining (ASM) sector. Well over 200,000 miners, working in tough, often dangerous conditions, rely on the sector for their livelihoods. This activity can be illegal in some cases but, as Trafigura has noted before, it cannot be wished away. Small-scale mining activities provide an essential livelihood for millions of people worldwide.

Those of us in the cobalt supply chain and wider metals industry cannot stand idle. We have a choice. We can either isolate and shun ASM workers, or we can roll-up our sleeves and improve the situation. Transforming working conditions and the lives of those impacted is surely in all of our best interests. And this is what we have been trying to achieve at the Mutoshi Cobalt Pilot Project in Kolwezi, DRC.

With the support of DRC authorities, and in a unique collaboration between concession-holders Chemaf, Trafigura, the cooperative COMIAKOL and the NGO Pact, amongst others, we have arranged semi-mechanised small-scale mining activities within the Mutoshi concession. Working within the framework of Trafigura's policies and the OECD's Due Diligence Guidance for Responsible Supply Chains, anywhere between 1,000 and 5,000 miners have participated in the project.

The project is by no means perfect, but it offers useful lessons in ASM formalisation. Above all, it has delivered a notable social and economic impact at a local level. We wanted to understand this impact more fully, which is why we commissioned this report. Researchers were given open access and have, as a result, harvested many

valuable insights. The human stories captured have resonated strongly with the broad-based improvements that we originally sought to achieve: "I must tell you that women's working conditions have improved significantly", said one of the miners interviewed.

The report highlights strengths, weaknesses and many areas for improvement. Our objective at Trafigura is to learn from these findings and play our part in ensuring that the developmental potential of cobalt – whether from large scale or small-scale production - is ultimately realized.

**James Nicholson**

**Head of Corporate Responsibility, Trafigura Group**

[www.trafigura.com](http://www.trafigura.com)

# 1

## Summary of main findings



This report, commissioned by the Trafigura Group, summarizes an analysis of the local economic impacts of a responsible sourcing partnership between the Trafigura Group (a commodities trading and logistics company), Chemaf (a mining company), COMIAKOL (a cooperative for artisanal and small-scale mining), and Pact (an international NGO) at the Mutoshi mine in Kolwezi, DRC. The main objective of the partnership has been to ensure the safe and secure delivery of cobalt to the market by working with artisanal miners (AMs) within the Mutoshi concession. A pilot project was initiated in January 2018 and is ongoing. Project implementation has coincided with significant volatility in the price of cobalt—more specifically a rapid fall as of April 2018—at the time when the project was just fully up and running.

Through the project, participating members of COMIAKOL have been provided with a comprehensive package of assistance to increase their productive capacity and improve their working conditions. The package has included geological information (location of minerals), mechanized assistance (preparation and cleaning of the site), delivery of various forms of training, provision of safety equipment, and amenities such as sanitary facilities, healthcare, and more.

The original objective of the project was to ensure that minerals sold by COMIAKOL to Chemaf were sourced in accordance with both OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas and Trafigura's Responsible Sourcing Artisanal and Small-Scale Mining (ASM) Expectations. As the project was designed as a commercial sourcing agreement between Chemaf and COMIAKOL, socio-economic objectives and related key performance indicators were not specified, nor was a baseline survey conducted. For these reasons, it has not been possible to perform a full-scale statistical, empirical evaluation of the local economic impact of the Mutoshi pilot project. The evaluation should thus rather be considered a rough estimate of the potential impact of the project in this area.

Our analysis is based on qualitative and quantitative information. Interviews and focus group discussions were carried out with miners as well as key informants among the project stakeholders. In addition, a quantitative survey was administered to 319 project participants and 110 AMs that were not part of the project and were used as a comparator group.

The analysis shows that when implemented with all its components, the project had a strong positive impact on participating AMs and contributed significantly to the local economy, but it has not insulated participating AMs against the dramatic fall in price of cobalt. Many positive effects have nonetheless endured, and key achievements include:

- **The project has had significant and positive impacts on productivity of participating AMs when they were on site.** Overburden stripping, provision of geological information, and better work-place organization helped increase output per hour worked. However, several services provided by the project were withdrawn during the first half of 2019, which caused a serious relapse in productivity for participating AMs.
- **The project has also helped reduce much of AMs' operating costs,** e.g., transportation of produce to trading places, and eliminated bribes paid to corrupt military and security forces.
- **Working conditions of participating AMs have been remarkably improved.** AMs now work in much more hygienic and less dangerous conditions, and they work fewer hours viewed against the comparator group. AMs feel safer at their workplace and are able to spend more time with their families. These improvements have been sustained during price fluctuations.
- **The Mutoshi mine is now a safer, cleaner environment and accessible healthcare services have improved the health of participating AMs' significantly.** Whether compared to their own situation before the project started or set against the comparator group, the

project participants are now much less likely to lose working days due to illness or injury. Their spending on healthcare has fallen as a result of improved health and the fact that healthcare is provided free of charge on the site.

- **The project has had a noticeable impact on the local economy, including the creation of new businesses in response to higher demand for goods and services.** Miners spend an estimated three quarters of their total spending on consumption items on goods that have been locally produced. For every 1,000 miners at the site, the local economic impact is estimated at around US\$1 million per year. The additional local spending attributable to the project is measured as the difference in local spending between the project group and the comparator group.
- **Female AMs participating in the project have greater diversity of roles and earn about two and a half times more than their counterparts working in mines outside the project site.** Following the project launch, some women were able to move from female dominated occupations (washing) into typically male dominated occupations (operating diggers, etc.) that offer higher earnings. They also report that workplace harassment from male colleagues has decreased and that improved site sanitation (clean water and toilets) has had a positive impact on their health and wellbeing. Furthermore, with the departure of military persons that were previously deployed to protect the site from AMs, the vast majority of new businesses started in the area were owned by women, reflecting a more secure working environment and greater opportunity for female business owners.





Taken together, the evidence points to a project model with significant potential, although more information is needed to ascertain full impact and cost effectiveness of the project (see below). Nonetheless, these preliminary findings suggest the making of a private-public project model that could successfully be applied in other areas where AMs are active. A set of recommendations emanate from the analysis of project impact, for the Mutoshi pilot project specifically and for replicating the project elsewhere:

- During a favorable price context when all of the project deliverables were being implemented, the Mutoshi project functioned very well in terms of improving the livelihoods of AMs. From an economic perspective, **the pilot project appears to have contained the right components and could be replicated in a similar format.**
- When the price of cobalt fell, severe challenges with the Mutoshi pilot project occurred, which threatened its sustainability. **Price volatility is an inherent feature of the mining sector and should thus be factored into project design.**
- To manage expectations of the AMs and avoid obstructions such as strikes, informal selling of minerals, etc., **transparency and detail of stakeholder obligation agreements** will be important, including contingencies, such as the purchasing price model between Chemaf and COMIAKOL. The agreement could also specify clear trigger points identified upfront for any changes in the project, e.g., the price level at which key project components can no longer be provided by Chemaf.
- To inform the appraisal and design of any new project, **a full-scale project evaluation of the pilot project should be considered.** Such an evaluation should (i) reflect all project phases from inception to implementation; (ii) focus on institutional arrangements (such as detailed obligations and expectations of all relevant stakeholders); and (iii) assess cost effectiveness of the project relative to its objectives. The cost assessment should incorporate an evaluation of socio-economic and

other benefits for AMs relative to the costs incurred for providing services under the project.

- ASM has garnered increased attention and resources by the international development community. Opportunities for future **collaboration with the international development community should be explored**, e.g., by offering the project model as an avenue for interventions directed at the AM community and building on the knowledge created under the World Bank-managed Communities and Small-Scale Mining (CASM) initiative, to learn from, standardize, and refine the project model further.
- To strengthen monitoring and evaluation of any new project, **a project appraisal should be undertaken at the outset** that clearly defines the project rationale, objectives, inputs, outputs, roles of different actors, as well as when and how to measure impacts (indicators and means of verifications). A baseline study should be part of the project appraisal.
- The current project, as well as any future projects, needs to establish **exit strategies for all relevant stakeholders**. Expectations—by AMs, local community, government at different levels, private sector partners—must be well managed and based on transparent and realistic obligations of different project partners. By the end of the project implementation period, full responsibility for coordinating activities should be assumed by local partners, i.e., COMIAKOL, SAEMAPE, and Chemaf. This hand-over must be planned and spelled out well in advance. Likewise, if the business case for the project disappears, there needs to be orderly exit by stakeholders.
- To help sustain AMs' incomes during price falls, stakeholders could consider whether the project design would benefit from **including provision of arrangements for savings, vehicles, or insurance mechanisms, as well as avenues for diversification out of mining.**



# 2

## Introduction

<sup>1</sup> International Monetary Fund (2019), "Democratic Republic of the Congo: 2019 Article IV Consultation" (Washington), available at <https://www.imf.org/en/Publications/CR/Issues/2019/09/04/Democratic-Republic-of-the-Congo-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-48648>.

<sup>2</sup> H. Sanderson (2019), "Congo, child labour and your electric car", The Financial Times, July 26, 2019.

<sup>3</sup> World Bank Country Overview, available at <https://www.worldbank.org/en/country/drc/overview>, accessed September 20, 2019.

### Background

The Democratic Republic of the Congo (DRC) has significant endowments of natural resources and accounts for more than 70 percent of the world's production of cobalt. Natural resource extraction contributes to more than one quarter of GDP, generates 95 percent of export earnings, about a third of government revenue, and 10 percent of employment.<sup>1</sup>

Global demand for cobalt began soaring in 2017, driven by battery production for information technology products as well as electric cars. Labour intensive artisanal and small-scale mining (ASM) has played an important role in satisfying this demand. Although most of the DRC's cobalt production is undertaken by large scale, capital intensive mining enterprises, ASM has accounted for 30 percent of total exports. The number of artisanal miners (AMs) involved in cobalt mining is estimated at 150,000, many of them operating informally in the vicinity of concessional land.<sup>2</sup>

Opportunities for gainful employment are critical in a country where three in four people are estimated to be living in extreme poverty.<sup>3</sup> At the same time, the role of AMs in the production of raw materials for batteries has been a source of controversy, as AMs are generally working in extremely hazardous conditions, with high risk of fatalities, injuries, and disease, and a high prevalence of child labor. These hazards are the result of a lack of knowledge of where minerals are concentrated, working without safety equipment in deep and long tunnels and shafts (often those deserted by larger mining companies) that run the risk of collapsing, unhygienic conditions that can expose AMs to dangerous water-borne diseases like dysentery and cholera, and respiratory damage from cobalt dust. The plight of AMs has thus become an area of focus in "responsible sourcing" as a means to increase the environmental, social, and economic sustainability connected with globalized mineral supply chains.

In the wake of rapidly increasing demand and high world market prices for cobalt, ASM expanded rapidly in and around the city of Kolwezi in the Lualaba province, where many households directly or indirectly depend on the mining sector. In January 2018, a collaboration for responsible sourcing began between Trafigura Group (a commodities trading and logistics company), Chemaf (a DRC based mining company), COMIAKOL (an ASM cooperative), and Pact (an international non-governmental organization). The main objective of the partnership has been to ensure the safe and secure delivery of cobalt to the market by actively involving AMs in production and improving their working conditions. This pilot project (henceforth "the Mutoshi Pilot", after the name of the concession) has involved assisting AMs on their site with stripping (i.e., removal of soil and rock above mineral repositories), delivery of various forms of training of COMIAKOL members, provision of safety equipment, and other related activities to enhance productivity of AMs and improve their working conditions.

The pilot project's initiation in January 2018 coincided with the beginning of a very rapid decline in cobalt prices, due in part to oversupply in response to global demand, exacerbated by high response by AMs. Prices fell markedly, from an all-time high at US\$90,000 per ton in early 2018, to below US\$30,000 by mid-2019 (Figure 2.1). At the time of writing this report, prices had somewhat recovered US\$35,000 per ton as of November 11, 2019.

### Objectives of the analysis

This report was commissioned by Trafigura Group with the objectives to assess the local economic impact of the Mutoshi Pilot and to provide insights into the socio-economic effects of the project on AMs and their families. The analysis is not intended to provide a full-scale evaluation of the project's relevance, efficiency, or impact on beneficiaries and community.

**Figure 2.1** Cobalt price volatility  
US\$100K



Source: London Metal Exchange, <https://www.lme.com/en-GB/metals/Minor-metals/Cobalt#tabIndex=2>.

# 3

## Project description<sup>4</sup>

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As no formal project appraisal document for this pilot project is available, this section is based on information about the project gathered through interviews with representatives from Trafigura and Pact, as well as information available on Trafigura's website. [www.trafigura.com/responsibility/responsible-sourcing/](http://www.trafigura.com/responsibility/responsible-sourcing/).

5

The sequence of trading procedures and internal controls is provided in Annex 1.

6

According to DRC laws, AMs are only operating legally if they are member of a co-operative, and all co-operatives need a license for mining.

In January 2018, the **Trafigura Group** entered into a three-year marketing agreement for cobalt hydroxide with **Chemaf** and its parent company Shalina Resources Ltd. One component of the agreement provided for Trafigura's ongoing support to Chemaf in building the company's ability to manage social and environmental impacts across its operations. A key issue of concern, given Chemaf's objective to mechanize, in part or in full, cobalt extraction at the site, related to the livelihoods of thousands of AMs (and wider community members) living within the boundaries of the Mutoshi concession.

In January 2018, Trafigura engaged the NGO Pact to support Chemaf in the implementation of a formalization strategy whereby those engaged in ASM within a defined area of the concession would be required to meet Trafigura's Responsible Sourcing Artisanal and Small-Scale Mining (ASM) Expectations as well as OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (see Box 1). Pact has extensive experience of working with ASM in challenging environments and is a sector leader in the practical implementation of responsible ASM sourcing.

The Mutoshi Pilot was established in January 2018. The project aims to build capacity of on-site suppliers, workers, and stakeholders to maintain Trafigura's Expectations and other international standards as well as improve socio-economic conditions for the AMs and their families.<sup>5</sup> The **COMIAKOL** co-operative was chosen as the AM partner as it draws its members from the local community and as it was already in the process of obtaining a mining license.<sup>6</sup> Since the start of the project, about 5,000 AMs have registered as members of the COMIAKOL co-operative. For security reasons, no more than 5,000 AMs are allowed on-site on any given day. However, the numbers of workers on-site vary as most workers operate on a bi-weekly shift. On April 1, 2019, the average number of AMs entering the site numbered nearly 2,700, but by September this had fallen to under 900. In order to enter the Mutoshi site, all AMs have to be



members of COMIAKOL and carry with them identity cards developed specifically for the site. The site has also been fenced-off to avoid external miners or family members from accessing the mine.

Working in daily contact with Trafigura, **Pact** has been in charge of designing the scope of the pilot project and currently provides technical support and on-the-job training on occupational health and safety, roles and responsibilities, specialized cooperative training, security and human rights, ASM labor transitioning and resilience, as well as data collection and monitoring of the project.

Assessments conducted by Pact are reinforced on a quarterly basis by Trafigura's appointment of the responsible supply chain consultancy, **Kumi**, whose mandate is to scrutinize the project in depth and report back on performance to Trafigura, Chemaf, and Pact, as well as selected downstream partners. Kumi assesses the project's performance against the OECD Due Diligence Guidance for Responsible Supply Chains of

**Box 1. The OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.**

*"The OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas clarifies how companies can identify and better manage risks throughout the entire mineral supply chain, from miners, local exporters and mineral processors to the manufacturing and brand-name companies that use these minerals in their products.*

*The Guidance aims to help companies respect human rights, observe applicable rules of international humanitarian law in situations of armed conflict, avoid contributing to conflict, and cultivate transparent mineral supply chains and sustainable corporate engagement in the mineral sector. The objective of the Guidance is ultimately to promote responsible private sector engagement in post-conflict fragile states."* (A Global Standard: Towards responsible mineral supply chains, p.1)

*"The Guidance provides 'suggested measures to create economic and development opportunities for artisanal and small-scale miners' calling on*

*all stakeholders to engage in legalization and formalization programs of artisanal mining communities. The objective is two-fold:*

- To build secure, transparent, and verifiable supply chains from mine to market and enable due diligence for legitimate ASM.*
- To ensure that legitimate artisanal mining communities can benefit from ongoing trade in conflict-affected and high-risk areas, to support their development and thus contribute to the general improvement of the situation on the ground."*(A Global Standard: Towards responsible mineral supply chains, p.2)

*Source: OECD, A Global Standard: Towards responsible mineral supply chains.*

*Brochure available at [http://mneguidelines.oecd.org/Brochure\\_OECD-Responsible-Mineral-Supply-Chains](http://mneguidelines.oecd.org/Brochure_OECD-Responsible-Mineral-Supply-Chains).*

Minerals from Conflict-Affected and High-Risk Areas; the International Finance Corporation's (IFC) Performance Standards; Trafigura's Business Principles for Health, Safety, Environment, and Community Performance; and Trafigura's Responsible Sourcing and Supply Chain Expectations, including the Expectations specifically designed for this semi-mechanized context. Adherence to these minimum requirements is central to project activities and monitoring.

Chemaf and COMIAKOL have negotiated a price agreement for the cobalt produced at the Mutoshi mine and Chemaf has committed to purchasing all of the cobalt produced by the COMIAKOL members. This partly

protects COMIAKOL members from income risks related to volatility in market prices and fraud among traders. Chemaf is also providing geological data to the miners, heavy earth moving equipment for waste stripping, controlled areas for the washers, and trucks for moving the cobalt to a depot where it is cleaned, graded, and purchased. In addition, Chemaf is in charge of safety procedures, health services, safety equipment, community liaisons, and managing the excavators. In this context, excavators are required to remove waste and ensure that at no point do pits dug by AM's exceed 10 meters in depth. DRC's State Regulator for ASM Service for Assistance and Supervision of Artisanal and Small-Scale Mining (**SAEMAPE**) conducts safety inspections,







and, until recently, had as many as 11 officials on site. Together, the various stakeholders monitor different aspects of safety, including child labor. For a full outline of how the project is structured, please refer to Annex 2.

To date, the project has provided benefits to the AMs such as improved sanitary and health conditions by the installation of on-site toilets, supply of clean water, and a health clinic next to the site; improved working conditions, including better management of safety risks, through the establishment of eight-hour work shifts, elimination of deep shafts and the introduction of open pits, buses for transportation between the site and the buying station to avoid pedestrians on the roads; and improved safety conditions through the provision of protective masks, hard hats, boots, gloves, and fences around the mine site.<sup>7</sup>

Recently, however, project implementation and impact have been severely affected during a dip in the world market price of cobalt. In response to a serious drop in turnover and lack of liquidity, certain project deliverables were withdrawn by Chemaf, such as regular and frequent payments to the miners, stripping of the mine site, and replacement of worn or lost safety equipment. A widening differential between what Chemaf pays COMIAKOL and prices in nearby markets has also led COMIAKOL to withhold its sale to Chemaf on a few occasions, and has likely led some AMs to individually and illicitly sell their produce on the outside market.

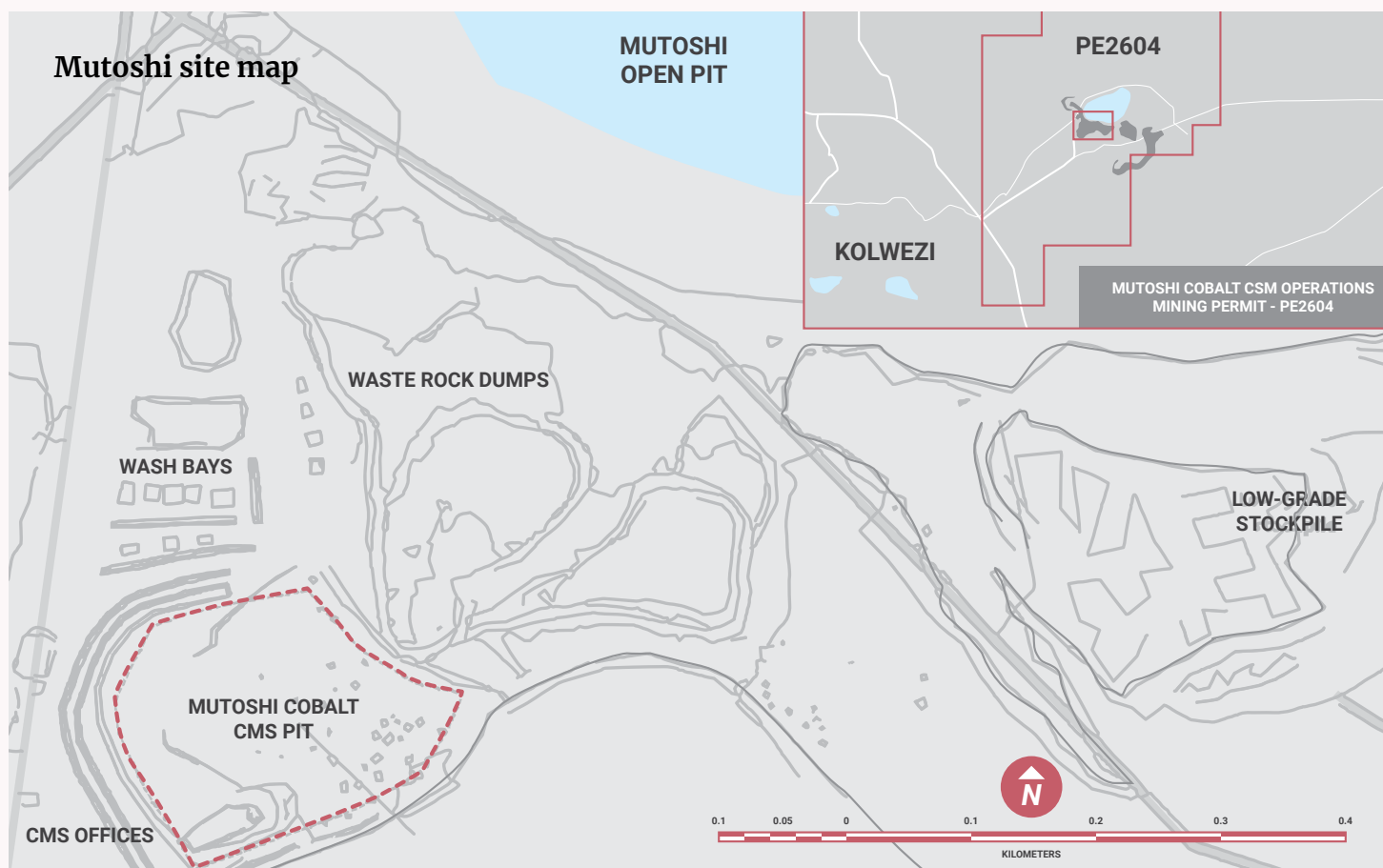
7

These work tools were integrated into their habits with the formalization and were given free of charge by the COMIAKOL and Chemaf. It should be noted, however, that during visits to the Mutoshi site, the team noted a significant number of AMs whose outfits were already worn and who worked without the protective masks. The miners mentioned that the equipment distributed at the beginning of the formalization were either lost or already damaged and therefore no longer usable. NB. In November 2019 new PPE was issued to all workers on site.

**Table 3.1** Project timeline

PERIOD	Jan–Mar 2018	Apr–Jul 2018	Jul–Dec 2018	Jan–Apr 2019	Apr–Jul 2019	Jul–Sep 2019	Sep–Oct 2019
Cobalt price (US\$ per metric ton), 2%*	500	500	300	140	154	105	140
Cobalt price (US\$ per metric ton), 1.5%			205	85	95	60	85
Quarry development	Area prepared for stripping. Unstable ground. Many wells with tunnels	Stripping of areas A1 and A2, Washing pools created	Stripping areas B1 and B2	All area stripped	No regular stripping on the site	No continued stripping on the site. No removal of mining residues	Mining residues removed
Observation	High levels of production	High levels of production	Very high levels of production. Price fall	Continued and drastic price fall	Low production levels. Delayed payments	Critical period due to low prices	Some price recovery. Delayed payments

Source: Project staff. Note: 1. Chemaf's buying station only accepted material of two percent purity.



# 4

## Evaluation Approach and Method

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The number of AMs working at the Mutoshi project has since increased, with an average of 1,600 – 1,800 COMIAKOL members entering the site in mid-November 2019.

9

The representativeness of the survey respondents is an issue. The survey reached a significant share of active AMs. At the same time, the group that has remained on the site may not be representative of the average project beneficiary since the initiation of the formalization project. It is possible that those who have left are those with alternative income streams (their own, or from their families), more entrepreneurial spirit or better social/network connections. It may be that the group that is left is the least productive one, with lower entrepreneurial spirit, with fewer outside options. Alternatively, the group that is left may constitute more productive miners who have been able to manage even with lower prices. Our data do not allow us to answer these questions, but they should be kept in mind when interpreting results.

10

Data have not been adjusted for potential outliers.

The key evaluation question addressed by this assignment is: What is the local economic impact of the Mutoshi Pilot Project? To estimate this, the team considered two measures of economic impact:

1. The direct project impact on AMs' productivity and earnings. Training (on working methods and safety), productivity enhancing services provided by Chemaf (stripping, geological information, transportation etc.), and improvements in health (open pits, safety equipment, toilets, health center) should contribute to increasing earnings relative to no project taking place.
2. The indirect project impact on non-AM actors, through the propensity of miners to spend their income on work-related and household-related goods and services, and spend it locally, leading to additional business opportunities (tool makers, catering, transporters, etc.).

The team also considered some additional important non-pecuniary benefits such as improved working conditions, health, and education as objectives in themselves, as well as impact on family life.

As the project was designed as a commercial sourcing agreement between Chemaf and COMIAKOL, socio-economic objectives and related key performance indicators were not specified, nor was a baseline survey conducted. Hence, a description of critical indicators before the project's beginning against which to measure progress is lacking.

To provide a credible analysis of project impact, the team designed a research approach involving a quantitative survey administered to (a sample of) project beneficiaries as well as a comparator group; qualitative interviews with miners, their families and local businesses; key informant interviews (KIIs); and on-site observation by the team of enumerators and the team leader. This mixed method approach allowed for both more rigorous data collection and corroboration of this data with longer conversations and interviews, and an understanding of motives and processes underlying different outcomes.

### Quantitative survey

A quantitative survey in the French language (the ASM survey) was designed, tested, and rolled out in September 2019. At the time of the survey, fewer than 1,000 AMs were working on the project site (the number of daily entrants dropped from 2,695 at the beginning of April 2019 to 864 on the latest recorded date during the survey period, which was September 11, 2019).<sup>8</sup> The survey was administered to 319 AMs that participated in the Mutoshi pilot project (ASM Project Group) and 110 AMs that did not participate in the project (ASM Comparator Group). The AMs in the Comparator Group came from the mining site of Kapata, selected because it is informal and only a few hours' drive from the Mutoshi mine. The sample sizes were chosen with budget and time constraints in mind. Women made up 39 and 45 percent of the ASM Project and ASM Comparator groups respectively.

The quantitative survey collected information on key demographic characteristics of the respondents and their families, their type of work, remuneration and working conditions, work history with a recall of remuneration and other characteristics before the project, expenses and financial behavior, and, for the ASM Project Group, the subjective view on the project as well as plans for the future.<sup>9</sup> The survey was designed as parsimoniously as possible to gather critical data without keeping miners away from their work for an extended period, which would likely have led to fewer responses.

Due to the lack of baseline information and because of the price fall affecting earnings during project implementation, the comparison with a comparator group and qualitative interviews are essential to our evaluation. This said, the approach is by no means comparable to a formal evaluation that can yield statistically significant results on impact.<sup>10</sup>

### Qualitative interviews

Qualitative data collection was also undertaken in September 2019.

The team conducted **focus group discussions (FGDs)** with the ASM Project Group and their family members. They team also conducted an FGD with local businesses operating in the vicinity of the mine.

The main target of the **semi-structured KIIs** was project partners and stakeholders (Pact, Chemaf, COMIAKOL, and government representatives from SAEMAPE and Division des Mines). In addition, the team conducted in-depth interviews with some of the AMs.

The list of interviewees is provided in Annex 3. An in-depth analysis of the qualitative information is provided in a background report.







# 5

## Evaluation findings

***“There are many people who have been crippled because of landslides. Currently, it’s okay. They did the stripping; there is not a single shaft in our site. The incidents have become minor: when you break the stones, you can cut your fingers and make small wounds that are handled by the clinic here. Personally, I was wounded by a stone, I was treated for two weeks at the clinic, and I did not pay anything.”***

### Who are the miners?

In the sample of respondents, the average ASM Project Group miner is 37 years old, and a majority are between 30 and 50 years of age (Table 5.1). There were no underage miners among the respondents in either the ASM Project or Comparator Group. Typically, miners have completed primary but not secondary school, and the share of low educated respondents is higher among women than men. All are Congolese, and a majority are from the area (although this may reflect that miners from other areas have returned home as business conditions worsened). The ASM Comparator Group is very similar in these basic characteristics.

The miners carry a significant responsibility for providing for their families. Their households consist of six persons on average, but with fewer than one additional person contributing to income. For the ASM Project Group, other household members contribute on average less than 20 percent to total household income. A negligible share of miners held other jobs. Mining income is central to the livelihoods of these families.

AM involves different occupations and tasks: those who dig the pits and remove outer layers of dirt (team leaders as well as subordinates), those who extract the material with picks, those who collect the material, those who transport it to and from the washing basin, and those who wash the material. The most common occupations on the site are diggers (who are not team leaders) and those involved in extracting, collecting, and sorting the material (Figure 5.1a). The earnings hierarchy is similar across the ASM Project and Comparator groups: team leaders earn the most, followed by those working with extraction/sorting/collection. Carriers and washers earn the least (Figure 5.1b). In the ASM Project Group, women are somewhat more likely to be washers than working directly on extracting or transporting the material within the site. This said, women in the Project Group are significantly more diversified among different occupations compared

to those in the Comparator Group. A majority of the ASM Project and Comparator Group respondents had been working on their respective sites before the pilot project. Prior to that, most of the ASM Project Group respondents were either unemployed or working in another mine. In the Comparator Group many people likewise had moved into working in the mine from unemployment or mining activities elsewhere, but relatively more workers had also joined the mine from other sectors, in particular agriculture and trade.

In spite of similarities in observable characteristics such as age, gender, and education levels, miners participating in the ASM Project Group and the ASM Comparator Group differed significantly in earnings prior to the project. As will be shown below, at that time, the Comparator Group had significantly higher gross earnings, several times more in fact, than the ASM Project Group. There is thus a possibility that those who chose to participate in the pilot project were less productive, more risk averse, or less able to procure good prices for their produce (less well connected politically/socially), than those who did not. Moreover, many miners from the ASM Project Group have deserted the Mutoshi site after the price fall. It is hence possible that these also belong to the more entrepreneurial, or higher risk takers, than the current ASM Project Group—i.e., that the current group is not fully representative of the full ASM Project Group, or indeed of AMs in general. The potential differences in capabilities or attitude must be kept in mind when assessing outcomes.

### Beneficiary testimonials: what do the artisanal miners say?

Interviews with project beneficiaries and others points to a strong appreciation of the program when all the components and services are in place. According to the AMs participating in the pilot project:

#### **The project improved health and sanitary conditions and reduced health spending**

*“There are many people who have been crippled because of landslides. Currently, it’s okay. They did the stripping; there is not a single shaft in our site. The incidents have become minor: when you break the stones, you can cut your fingers and make small wounds that are handled by the clinic here. Personally, I was wounded by a stone, I was treated for two weeks at the clinic, and I did not pay anything.”*

*“I haven’t been sick for more than a year, whereas before [joining the cooperative] I became sick almost every three months; I spent a lot of money on treatment; currently this money is saved and used for other needs of the family.”*

*“Four years ago, I got hurt and had to pay CDF 25,000 [US\$15] for treatment. Last year, I had the same injury but was treated at the clinic of the site; I saved CDF 25,000 [US\$15], if not more. So not only are there fewer injuries*

**Table 5.1** Miners' bio-data: Overview

	ASM PROJECT GROUP			ASM COMPARATOR GROUP		
THE MINERS	Men	Women	Total	Men	Women	Total
Number	196	123	319	60	50	110
Gender share of total %	61%	39%	-	55%	45%	
<b>Age (years)</b>						
Average	34	40	37	35	37	36
Youngest			19			20
Oldest			69			63
<b>Education (highest level completed)</b>						
Below secondary	75%	96%	83%	70%	96%	82%
<b>Their households (average number of persons)</b>						
Average household size	5.9	6.2	6.0	6.0	7.2	6.5
Age dependents (<15 or >64 years)	2.9	3.2	3.0	2.8	3.5	3.1
Other household members contributing to income	0.6	0.8	0.7	0.8	1.2	1.0

Source: ASM survey, September 2019.

and diseases, but also, and especially when you have minor injuries, you are taken care of by the clinic at the site."

"You know, since we work in the open area, this problem [of chronic cough] has disappeared. Before, I often spent money buying cough medicines from pharmacists, but today I do not do that anymore."

#### **The project reduced monetary and psychological costs of harassment by individual government agents**

"Whenever they [the agents of SAEMAPE] came to the site, we were anxious, they always found a reason to extort money. We were choked by this service. Since we have been working with the co-operative, all the hassles of SAEMAPE have disappeared."

"These people [the agents of SAEMAPE] never miss offenses when they go down in the mines, they always find a way to extract a little money from the AMs. But now it is over with the co-operative, we do not even see it here in the mine anymore, because they know we cannot give them anything anymore."

#### **The project reduced workplace harassment for women**

"I must tell you that women's working conditions have improved significantly. The verbal and physical assaults against women that I have experienced in some sites, even here in Mutoshi before, have completely disappeared. We have to recognize that thanks to the co-operative, things have improved a lot here."

#### **The project improved family life**

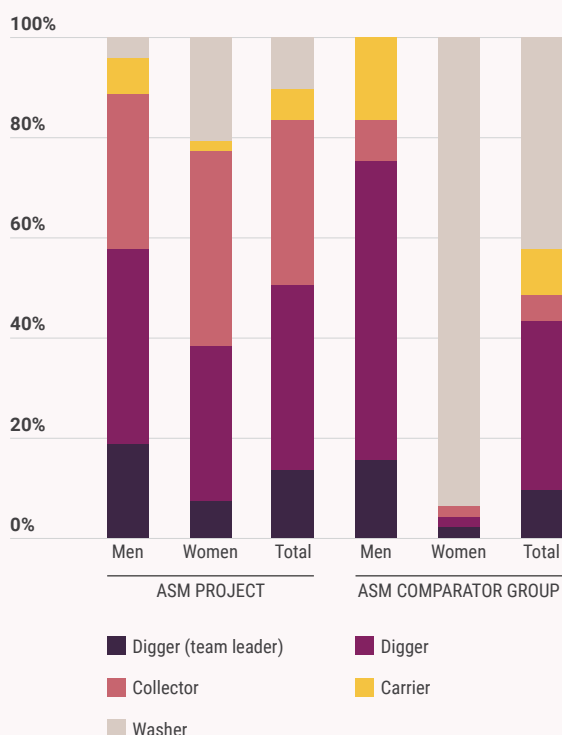
"Before, I could stay even three days in the site. There was no follow-up of the children, their education suffered. I know many people here who have divorced their wives because of their extended absences from their families. But currently, I go home every day, no later than 5 or 6 pm I am already at home. So, I can see my children and my wife every day, I can follow their education, which strengthens family ties. I think this formalization has helped stabilize many households by allowing us to be more present in our families."

#### **Productivity substantively improved during the period when all project components were in place, but fell back when some services were withdrawn**

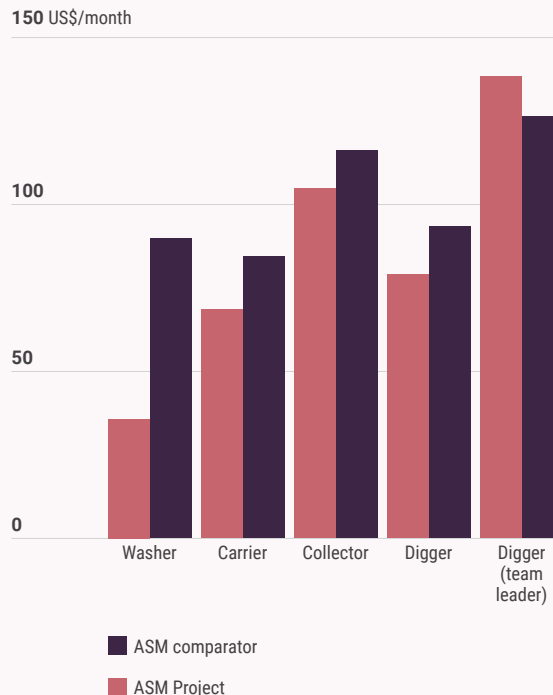
"You know, before when the trucks [mechanical diggers] were regularly passing to remove waste, between July 2018 and February 2019, our team produced about 50 to 60 bags a day. But today, we waste three hours a day removing garbage each morning and only work for five hours. Our production has dropped almost by half..."



**Figure 5.1a** Respondants by type of job



**Figure 5.1b** Average earnings by job type



Source: ASM survey, September 2019.

<sup>11</sup> The difference between the current average incomes for ASM Project Group and ASM Comparator Group is statistically significant at the 1 percent level.

## Evaluation of impacts on miners and their households

### Earnings, productivity, and operating costs

The Mutoshi pilot project has had a strong impact on productivity of the AMs and although the ASM Project Group has suffered a sharp decline in income due to the fall in the price of cobalt, they have still fared much better than the ASM Comparator Group. In addition, operating costs for the miners at the Mutoshi site have been reduced considerably.

The fall in the price of a ton of cobalt between the initiation of the formalization in January 2018 (US\$500 per ton for cobalt at a level of 2 percent) and September 2019 (US\$120 per ton at 2 percent level) has adversely affected incomes of AMs at the Mutoshi site. For the ASM Project Group, the average monthly income has fallen by 53 percent. While women lost about 55 percent of their income, men lost about 52 percent and 98 percent of the ASM Project Group stated that unstable income was currently their biggest problem. For the ASM Comparator Group, however, the average income fell even more

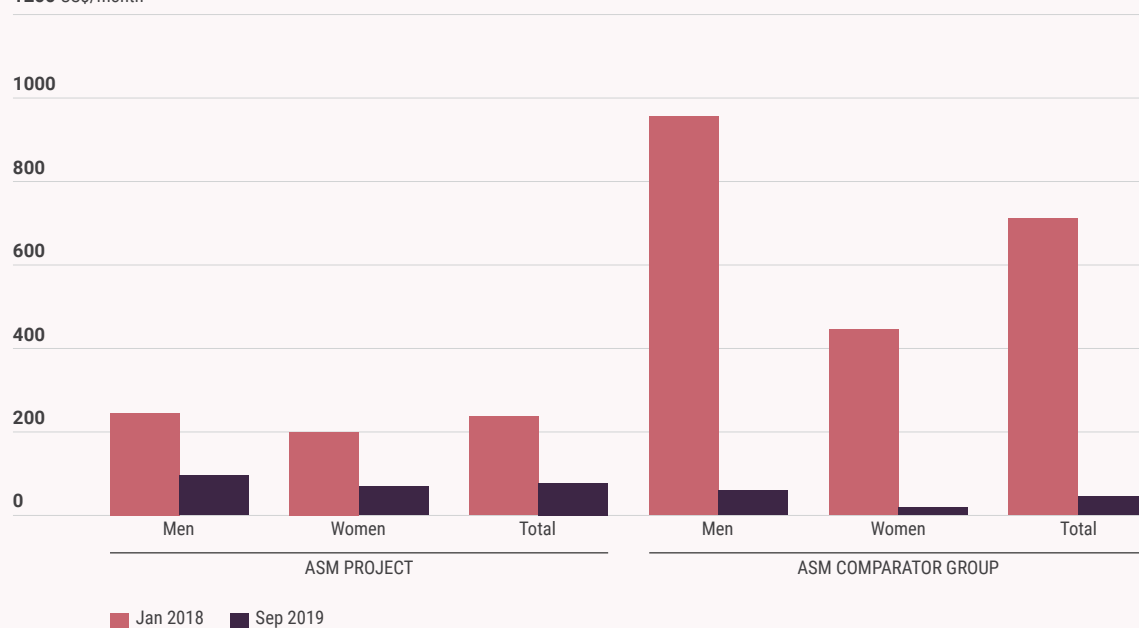
dramatically, by more than 90 percent. While women lost about 92 percent of their incomes, men lost about 90 percent (Figure 5.2)

In addition, it should be noted that although the ASM Project Group came into the project with a previous substantially lower average income than those of the Comparator Group, they currently have a higher average income than those not benefiting from the pilot project. The ASM Project-Comparator group gap of US\$43 per worker per month, or US\$516 per year, provides a first estimate of the project's additional impact.<sup>11</sup>

Looking at the impact of the pilot project on productivity, all AMs participating in the qualitative interviews reported a strong increase in production after project initiation: exploitation became easier after the stripping and improved working conditions led to an increased productivity at the individual level. Table 5.3 provides examples of productivity increases of between nine to 35 percent for five AMs from the Mutoshi site interviewed during our research. In addition, as the Mutoshi mine attracted new AMs who left underground mines in other sites to work in Mutoshi, overall output of the Mutoshi mine site itself increased.

**Figure 5.2** Average monthly gross earnings

1200 US\$/month



Source: ASM survey, September 2019.

**Table 5.3** Comparison of the productive capacity of artisanal miners participating in the Mutoshi project, before and after formalization

NUMBER OF BAGS	PRODUCTION BEFORE PROJECT		CURRENT PRODUCTION	
	(24 working hours) <sup>1</sup>	Bags per hour	(8 working hours)	Bags per hour
Interviewee 1	40	1.67	18	2.25
Interviewee 2	50	2.08	20	2.50
Interviewee 3	45	1.88	17	2.12
Interviewee 4	60	2.50	25	3.12
Interviewee 5	55	2.29	20	2.50

Source: Interviews with AMs, September 2019.

Almost all the AMs interviewed at the Mutoshi mine said that, before formalization, they used to enter the mine in the morning only to come out the following morning. See also Beneficiary testimonials on page 18.

<sup>12</sup> These costs do not incorporate the cost of food (on-site) or other production costs like the purchase and the repair of tools.

<sup>13</sup> Payment delays have since been resolved and AMs are now paid daily.

***"Compared to the ASM Comparator Group, miners in the Project Group work fewer hours (although they earn more) and are also much less likely to be absent due to injury and illness."***

The pilot project has also contributed to a reduction in operating costs for the AMs. An AM who worked on the Mutoshi site before formalization faced a production cost of about CDF 3,000 [US\$1.8] for a 50 kg bag of ore<sup>12</sup>. In addition, the AM had to pay between CDF 5,000 to 10,000 [US\$3-6] for his/her own transportation to safeguard the bags all the way to the selling center. Currently, as a result of open-pit mining procedures and Chemaf being the only buyer, most of these charges have been removed. Production costs now only amount to about one-third of previous levels and miners no longer have to pay for safeguarding their bags.

In addition, and as discussed below, facilitation payments (bribes, irregular fees charged by authorities) have all but disappeared. At the beginning of the formalization when cobalt prices were increasing rapidly, the rise in productive capacity and reduction of exploitation costs positively affected income levels of the AMs derived from ASM activities; more than half of the AMs interviewed acknowledged that their income increased by more than 100 percent just after the project began.

Recently, however, Chemaf has withdrawn several of the services provided to the COMIAKOL members. First, the company temporarily stopped regular stripping activities on the Mutoshi site. As the AMs were thus forced to remove the waste themselves, currently, on average, only five to six hours per day are spent digging; the rest of the time is spent cleaning the site. One group of diggers estimate that their production dropped from 25-30 bags per day in July 2018 to 15-20 bags by September 2019.

Second, whereas before AMs were paid daily or at the latest within 48 hours following their delivery of ore, during the field survey period AMs were obliged to wait two to three weeks before getting paid.<sup>13</sup> Late payments have seriously affected productivity as AMs incur a lot of expenses upfront for food, washers, transport, tools, bags etc.

Nevertheless, a little more than half of the respondents in the Project Group say that they will remain in the mining

sector in the near future but only about 40 percent of those say they plan to stay in the cooperative. In the Comparator Group, only 34 percent plan to remain in the mining sector.

### **Working conditions**

Compared to the ASM Comparator Group, miners in the Project Group work fewer hours (although they earn more) and are also much less likely to be absent due to injury and illness. Harassment by government agents and the military has fallen for the Project Group, as the main reason—informal mining—has disappeared with the formalization. Women also feel safer on the site.

The ASM Project Group miners work an average one hour less per day than miners in the Comparator Group. Both groups work about six days per week (Table 5.4) In the qualitative interviews, many AMs mentioned that, before the project, they were absent from their families three to four days per week. This prolonged absence from their homes had serious consequences on their households, on spousal relations, as well as on education of their children. By joining the co-operative, they were able to return home every day, which helped stabilize many homes.

The Project Group was remarkably less absent from work in the past three months than the Comparator Group; on average, the miners in the Project Group estimated they were absent about four days while the Comparator Group were absent more than twice that number. It is also noteworthy that women in the Comparator Group were absent almost three times more than the women in the Project Group.

95 percent of the ASM Project Group miners stated that their number of days absent due to injury or illness had declined since the initiation of the pilot project. However, it should be mentioned that more than half of the miners in the ASM Comparator Group also stated that their number of days absent due to injury or illness had decreased since January 2018, while the remaining part said the number of days absent had increased or remained stable.

### **Harassment**

Harassment of miners by government agents has all but disappeared since the initiation of the Mutoshi pilot project. Female workers in the ASM Project Group claim they are no longer harassed by male co-workers at the site.

Harassment and extortion of AMs by government agents is frequent in the ASM sector, as the example of the (unregulated) Kapata mine shows (Box 2). Prior to the project, some SAEMAPE agents spent a considerable amount of their time collecting illegal payments (extortion) rather than assisting AMs with capacity building in production or security training. This has changed, as shown by different testimonials from miners (see page 18).

More than half of the ASM Project Group claimed that, before the project, their work situation and income were affected by harassment from the authorities.

**Table 5.4** Impact on working conditions

THE MINERS	ASM PROJECT GROUP			ASM COMPARATOR GROUP		
	Men	Women	Total	Men	Women	Total
Hours of work per day	8.2	8.5	8.3	9.6	8.7	9.3
Days of work per week	5.9	5.9	5.9	6.0	5.7	5.8
Number of days absent in past three months due to:						
Injury	1.3	0.2	0.9	1.4	0.9	1.2
Illness	1.5	2.2	1.8	2.4	6.2	4.1
Other	1.4	1.6	1.5	3.2	4.3	3.7

Source: ASM survey, September 2019.

### Box 2. Harassment of artisanal miners by government agents – experience from the Kapata mine.

A team visit to Kapata, an unofficial mine, showed that artisanal miners are exposed to all sorts of harassment. There, as in many other informal mines, harassment begins at the entrance of the mines and continues in the shafts, at the exit of the mines, and up the roads that lead to the trading centers where the ASMs sell their minerals.

The AMs cite individuals from several government agencies as harassing them, forcing them to pay at the risk of being denied entry to the site or taking over their production: Agence Nationale de Renseignement, SAEMAPE, mining police, local chiefs (district chiefs or traditional chiefs), etc. Payment of these various charges is done either in cash or in ores. Very often, AMs have no choice

but to pay; their presence in the mine depends on the informal payments they make to these different services. One AM said, *“When they [the agents] go down into the mine, we have no choice but to pay them, otherwise they seize our production tools, close our shafts, and sometimes if we have to do with soldiers, they beat us seriously.”*

There are official taxes on the artisanal sector that are well known. However, according to several actors involved in the artisanal sector, the AMs also pay several illegal fees levied by state agencies, in particular the SAEMAPE and the mining police.

Source: Interviews with AMs, September 2019.

Many AMs estimate that, when they were operating illegally, they had to pay a sum ranging from CDF 2,000 to CDF 3,000 (US\$1.2 to US\$1.8) per day to the soldiers who ensured the security of the Mutoshi site. At the exit of the site, they also had to pay an equivalent sum or pay in-kind with ores to the military. Indeed, the mine being a property of Chemaf and according to the Congolese mining code, no artisanal mining activity was allowed on the site and any presence of AMs was thus illegal.

Female beneficiaries of the pilot project unanimously also say that harassments by male co-workers on the site have disappeared and the working conditions of women have clearly improved.

### Safety effects

Safety has improved at the Mutoshi site, in particular due to the use of open pits rather than shafts.

Safety is highly valued and a significant factor when choosing livelihoods. More than 70 percent of the ASM Project Group claim they joined the project to improve their working conditions with respect to safety. This was more important than access to profitable mining (30 percent) or stable income (25 percent). Over 90 percent of the ASM Project Group say the safety situation in the mine has undeniably improved compared to January 2018. This was also confirmed by all of the miners participating in the qualitative interviews. Landslides, which were previously the major cause of deaths and injuries in the mine, are no longer occurring.









### Sanitary conditions and health effects

Sanitary conditions have been improved at the Mutoshi site and, as a result, the AMs are healthier, less absent from work due to illness, and spend less on medication and hospital bills.

In general, the interviews with the AMs show that their state of health has improved since the project has closed the shafts and moved to the open pits and strict safety and hygiene measures have been implemented on the site. 82 percent of the ASM Project Group confirm that sanitary conditions have improved compared to January 2018 and 74 percent claim that their spending on health has fallen since the initiation of the pilot. There are fewer patients attending hospitals and the frequency of airborne diseases, which made many AMs unable to work for several days a year, has dropped significantly. For example, out of 10 people questioned about their frequency of illness, seven responded that they lost at least two weeks of work in 2017 because of typhoid fever and/or dysentery. These same seven people reported that over the past year, they did not get sick once. Many of the women who worked in the Mutoshi cobalt site before the pilot project also said that working in dirty water exposed them to urinary tract infections. In addition, they said installing clean toilets in the site has also contributed to the decline in this type of disease amongst women.



### Spending and investment

Overall spending has declined significantly for the ASM Project Group since initiation of the project, although less so than for the Comparator Group. With the drop in the price of cobalt, basic spending on food, clothing, and health have also fallen, while the pattern for educational spending is less clear. Initially, project formalization appears to have contributed to higher investment levels amongst the AMs, but these effects seem to have been gradually reversed with the sharp decline in the price of cobalt and corresponding earnings.

The average level of household spending in the ASM Project Group has declined by more than 60 percent since the initiation of the project. For the Comparator Group, spending declined slightly more (by almost 70 percent) over the same period. A vast majority of the ASM Project Group stated their spending on food, clothing, health, remittances, and savings has declined since the initiation of the project, while most respondents claim their spending on education and rent has remained stable. For the Comparator Group, average monthly spending on food over the past three months was lower than the Project Group.

With the fall in the price of cobalt, the subsequent decline in AMs' incomes has significantly affected their standard of living. Several of the AMs interviewed said some of their children have had to drop out of school because of lack of money to pay for school fees, but also that they have difficulties getting their family members treated in health centers when they are sick and now prefer bringing them to traditional healers, whose service are usually less expensive. Nonetheless, it should be noted that this pattern has not been confirmed by the quantitative surveys where educational spending remains high.

Several of the AMs interviewed confirmed they made significant investments at the beginning of the project. Out of 15 AMs interviewed, more than half used the additional income earned in the second half of 2018 to invest. Some bought plots of land, vehicles, or motorcycles, built houses, started small businesses, etc. However,



the recent drop in income has led several of them to sell these investments to finance the start of school for their children or provide their wives with capital to start a small business. In addition, other small acquisitions such as beds, televisions, radios, etc. have been sold to cope with the decline in family income.

#### **Female economic empowerment**

Unlike their counterparts in the Comparator Group, women in the ASM Project Group participate in cobalt exploitation and not just in washing. Women in the Project Group earn more than 2.5 times as much as women in the Comparator Group.

The role of women in artisanal mining is widely recognized and formalization of the Mutoshi site has reinforced the role of women in cobalt production. In Africa, women participate in almost all tasks in artisanal mining ranging from extraction, crushing, transportation, sorting and processing, to selling. Nevertheless, in the context of underground mining, women are often excluded from the work of extraction and their role is limited to transportation, processing, and sales.

As seen in Figure 5.1a, women in the ASM Project Group are participating in cobalt exploitation activities to a much higher degree than women in the Comparator Group, where almost all women are engaged in washing. In the Project Group, a few percent of the men are also working as washers, while this is not the case in the Comparator Group.

Interviews with female AMs confirmed that prior to Chemaf providing stripping services, they were totally absent from cobalt extraction. While they could previously not enter the shaft to dig cobalt, with open pits, women are now able to participate in extraction and produce between four to six bags a day, i.e., between 200 and 300 kg of cobalt.

## **Impact on the local economy**

Impact on the local economy—the additional income generated as miners spend part of their income on goods and services produced locally—depends on AMs' earnings and how they spend these earnings.

#### **Local businesses**

When the ASM businesses on the Mutoshi site were buoyant, there were positive effects in terms of both start-ups and expansion of local businesses, with some specific opportunities for female-run businesses.

Prior to the pilot project, the ASM Project Group miners sold their produce at a site about 15 km away from the mine. With the sale localized to Mutoshi, many small businesses have sprung up in the neighborhood (the Kabila district), aided by the increased productivity and income of the AMs participating in the project, as well as the departure of military that were previously deployed to protect the site from AMs. Such businesses include:

- Catering services (restaurants);
- Currency exchange (forex bureau);
- Tool sellers as well as maintenance and repair;
- Hair salons;
- Shops selling miscellaneous consumer goods.

A full business census was much beyond the scope of this analysis. Out of the 15 businesses around the site approached by the team, 11 business owners had started their businesses after the initiation of the pilot project. 10 of these new businesses were headed by women. A few of these women had left their jobs as washers on the site to earn their living selling food or telephone cards to the mining community. The women who had left mining had not seen drastically increased earnings but preferred the working conditions to working on the site. Most of the women had been jobless prior to starting their activity, however. They had benefited greatly from the income generated by their businesses, which had helped raise household income and empower the women.



14

Note that these consumption expenditures exceed reported earnings. It is not unusual for earnings to be underreported compared to consumption, due to reluctance to reveal one's earnings to a survey enumerator. Indeed, this is one reason, albeit one of many, that poverty measures in poor countries are often based on consumption rather than income.

15

Ideally the evaluation should compare expenses ex ante and ex post of the project for both the ASM Project Group and Comparator Group and look at the differences in changes over time. The gap between spending and income is also quite aspicuous.

Existing businesses also prospered from the project's productive phases. For example, a tool maker had seen his turnover quintuple at the height of cobalt prices in 2018. Although mining income would have increased everywhere, the higher productivity of the Mutoshi pilot project due to the partnerships with Trafigura, Pact, and Chemaf is likely to have had a stronger impact on local businesses. **In all, this suggests strong multiplier effects of the project in good times, and additional positive effects for women.**

Unfortunately, the impact on local economic activity, including gender specific outcomes, has not been sustainable because of the direct link to the mining businesses. Local businesses have clearly suffered from the collapse of production at the site—some businesses report having seen their income fall by approximately 80 percent compared to last year. Discussions with AMs, informants and business owners show that many of the small businesses opened at the beginning of the pilot project have either closed or relocated.

#### **Local spending**

To more formally gauge the level of local consumption generated by the project, the ASM Survey asked miners how much money they spent in direct relation to their work (transportation, food, etc.), as well as on main household consumption items such as food, clothing, housing, and other goods and services, vs. savings and remittances, and whether these goods/services were produced locally.

Our estimates suggest that, on average, a person in the ASM Project Group spends around CDF3.8 million per year (around US\$2,300) on goods and services that are locally produced, while a member of the ASM Comparator Group spends significantly less, only around CDF2.1 million, or US\$1,243.<sup>14</sup> The gap between the two groups amounts to US\$1,065 per person on average. These differences are consistent with the fact that the Comparator Group currently earns less than the Project Group (about two thirds) although the differences in spending are slightly

higher. For every 1,000 miners active on the Mutoshi site, the project's annual impact on the local economy through income spent amounts to more than US\$1 million. With a higher number of miners, the impact will be proportionally higher.

This number should be interpreted with caution however, mostly because of the lack of a baseline survey with which to compare outcomes.<sup>15</sup> Nonetheless, taken together the evidence suggests that the project has significant spillovers on the local community in terms of local spending.







# 6

## Conclusions and Recommendations

The analysis shows that when implemented with all its components, the project had a strong positive impact on participating AMs and contributed significantly to the local economy, but it has not insulated participating AMs against the dramatic fall in price of cobalt. Many positive effects have nonetheless endured, and key achievements include:

- **The project has had significant and positive impacts on productivity of participating AMs when they were on site.** Overburden stripping, provision of geological information, and better work-place organization helped increase output per hour worked. However, several services provided by the project were withdrawn during the first half of 2019, which caused a serious relapse in productivity for participating AMs.
- **The project has also helped reduce much of AMs' operating costs,** e.g., transportation of produce to trading places, and eliminated bribes paid to corrupt military and security forces.
- **Working conditions of participating AMs have been remarkably improved.** AMs now work in much more hygienic and less dangerous conditions, and they work fewer hours viewed against the comparator group. AMs feel safer at their workplace and are able to spend more time with their families. These improvements have been sustained during price fluctuations.
- **The Mutoshi mine is now a safer, cleaner environment and accessible healthcare services have improved the health of participating AMs' significantly.** Whether compared to their own situation before the project started or set against the comparator group, the project participants are now much less likely to lose working days due to illness or injury. Their spending on healthcare has fallen as a result of improved health and the fact that healthcare is provided free of charge on the site.
- **The project has had a noticeable impact on the local economy, including the creation of new businesses in**

### **response to higher demand for goods and services.**

Miners spend an estimated three quarters of their total spending on consumption items on goods that have been locally produced. For every 1,000 miners at the site, the local economic impact is estimated at around US\$1 million per year. The additional local spending attributable to the project is measured as the difference in local spending between the project group and the comparator group.

- **Female AMs participating in the project have greater diversity of roles and earn about two and a half times more than their counterparts working in mines outside the project site.** Following the project launch, some women were able to move from female dominated occupations (washing) into typically male dominated occupations (operating diggers, etc.) that offer higher earnings. They also report that workplace harassment from male colleagues has decreased and that improved site sanitation (clean water and toilets) has had a positive impact on their health and wellbeing. Furthermore, with the departure of military persons that were previously deployed to protect the site from AMs, the vast majority of new businesses started in the area were owned by women, reflecting a more secure working environment and greater opportunity for female business owners.

Taken together, the evidence points to a project model with significant potential, although more information is needed to ascertain full impact and cost effectiveness of the project (see below). Nonetheless, these preliminary findings suggest the making of a private-public project model that could successfully be applied in other areas where AMs are active. A set of recommendations emanate from the analysis of project impact, for the Mutoshi pilot project specifically and for replicating the project elsewhere:

- During a favorable price context when all of the project deliverables were being implemented, the Mutoshi project functioned very well in terms of improving the



livelihoods of AMs. From an economic perspective, **the pilot project appears to have contained the right components and could be replicated in a similar format.**

- When the price of cobalt fell, severe challenges with the Mutoshi pilot project occurred, which threatened its sustainability. **Price volatility is an inherent feature of the mining sector and should thus be factored into project design.**
- To manage expectations of the AMs and avoid obstructions such as strikes, informal selling of minerals, etc., **transparency and detail of stakeholder obligation agreements** will be important, including contingencies, such as the purchasing price model between Chemaf and COMIAKOL. The agreement could also specify clear trigger points identified upfront for any changes in the project, e.g., the price level at which key project components can no longer be provided by Chemaf.
- To inform the appraisal and design of any new project, **a full-scale project evaluation of the pilot project should be considered.** Such an evaluation should (i) reflect all project phases from inception to implementation; (ii) focus on institutional arrangements (such as detailed obligations and expectations of all relevant stakeholders); and (iii) assess cost effectiveness of the project relative to its objectives. The cost assessment should incorporate an evaluation of socio-economic and other benefits for AMs relative to the costs incurred for providing services under the project.
- ASM has garnered increased attention and resources by the international development community. Opportunities for future **collaboration with the international development community should be explored**, e.g., by offering the project model as an avenue for interventions directed at the AM community and building on the knowledge created under the World Bank-managed Communities and Small-Scale Mining

(CASM) initiative, to learn from, standardize, and refine the project model further.

- To strengthen monitoring and evaluation of any new project, **a project appraisal should be undertaken at the outset** that clearly defines the project rationale, objectives, inputs, outputs, roles of different actors, as well as when and how to measure impacts (indicators and means of verifications). A baseline study should be part of the project appraisal.
- The current project, as well as any future projects, needs to establish **exit strategies for all relevant stakeholders.** Expectations—by AMs, local community, government at different levels, private sector partners—must be well managed and based on transparent and realistic obligations of different project partners. By the end of the project implementation period, full responsibility for coordinating activities should be assumed by local partners, i.e., COMIAKOL, SAEMAPE, and Chemaf. This hand-over must be planned and spelled out well in advance. Likewise, if the business case for the project disappears, there needs to be orderly exit by stakeholders.
- To help sustain AMs' incomes during price falls, stakeholders could consider whether the project design would benefit from **including provision of arrangements for savings, vehicles, or insurance mechanisms, as well as avenues for diversification out of mining.**

# 7

## Annex 1: Sequence of trading procedures and internal controls



# Annex 2:

## Cobalt production process and key controls at Mutoshi

### 1. Extraction

Chemaf appointed a single cooperative, COMIAKOL, authorized by DRC Regulatory Authorities and representing approximately 5,000 AMs, to operate as a mining contractor on a designated area of the Mutoshi concession known as 'Mutoshi Cobalt'.

For safety reasons, Chemaf determined that only 5,000 workers can be present at Mutoshi Cobalt at any one time. Numbers onsite fluctuate and most workers operate on a week-on, week-off shift pattern.

The partnership working on this pilot project sought to introduce and enhance operational controls at Mutoshi Cobalt. Controls of note include:

- Workers must be at least 18 years of age. They must present officially recognized identity cards to register with the COMIAKOL cooperative.
- There is a single entrance to the Mutoshi Cobalt site and an electric fence around its perimeter.
- Personal protective equipment (PPE) has been issued free of charge to ASM workers at Mutoshi Cobalt, as well as to all workers at Chemaf's buying center.
- Only registered workers wearing PPE may enter Mutoshi Cobalt.
- Chemaf has distributed identity cards to workers. These are used both for verification and to facilitate the recording of data, such as hours worked.
- Workers are allocated demarcated zones within Mutoshi Cobalt. Any pits they dig must be less than 10 meters deep. They are not allowed to dig tunnels horizontally within their assigned zone.
- Chemaf, 'SAEMAPE' (DRC State Regulator for ASM or 'Service for Assistance and Supervision of Artisanal and Small-Scale Mining'), COMIAKOL and PACT conduct regular inspections and report on all incidents within a defined time period.

### 2. Processing

Having extracted cobalt ore from a controlled ASM area known as 'Mutoshi Cobalt', COMIAKOL then washes and prepares the material for sale in mineral washing basins. Doing so enhances the ratio of cobalt content to waste and, as such, the price that will be realised at point of sale.

All material recovered by AMs is handled and processed separately from material originating from Chemaf's mechanised mines.

Having extracted cobalt ore from 'Mutoshi Cobalt', COMIAKOL then washes and prepares the material for sale in mineral washing basins. Doing so enhances the ratio of cobalt content to waste.

### 3. Purchasing

Assisted by Chemaf, COMIAKOL transports cobalt ore from Mutoshi Cobalt to a single Chemaf operated buying station. At the buying station, Chemaf conducts a technical analysis of cobalt ore, prices material according to purity and then provides a payment to COMIAKOL's workers.

All cobalt ore from the 'Mutoshi Cobalt' ASM pilot project is received by Chemaf's single buying station, situated on the Mutoshi concession.

On arrival at the buying station, bags of ore are marked with a single identification code. That code is logged and a receipt is handed to the COMIAKOL representative responsible for its sale. Material is then crushed by Chemaf staff for sampling purposes, bagged and identified with the same identification code. Samples are then analysed for mineral content. Such samples may contain, for example, traces of cobalt, copper and iron.

Chemaf's preferred cobalt content for purchasing purposes is two per cent. According to the realised cobalt purity, Chemaf provides a cash payment to the relevant COMIAKOL representative.



# Annex 2:

## Cobalt production process and key controls at Mutoshi

...continued

The purchasing process typically takes one day. If the COMIAKOL representative is not satisfied with Chemaf's proposed payment they are permitted to remove material from the buying station for refining purposes. COMIAKOL representatives are not permitted to sell material outside of the concession, or to a buyer other than Chemaf.

### 4. Transportation

Cobalt ore leaves the buying station on trucks under tarpaulin that has been secured and tied by tamper-proof metal tags. Material from the Mutoshi ASM Pilot Project remains segregated at all times from material that has been mined at Chemaf's mechanised operations, for example, at their Etoile Mine.

A cargo manifest is drawn up prior to departure which is then forwarded to Chemaf's designated processing facility for verification at point of receipt.

On verification and approval, all ASM-sourced material is processed at a dedicated standalone facility, Chemaf's Usoke Plant. All cobalt ore recovered at Chemaf's mechanized mines is processed at its Etoile facility.

Once processed, the cobalt hydroxide produced by Chemaf's Usoke Plant is bagged and branded according to its processing origin (Usoke).

For storage, transport and onward export purposes, Usoke origin product (i.e. originally from the Mutoshi ASM project) remains segregated from any other material (e.g. of mechanised mine origin).

Source: [www.trafigura.com/responsibility/responsible-sourcing/](http://www.trafigura.com/responsibility/responsible-sourcing/).

# Annex 3:

## List of interviewees

NAME	STATUS	SEX	NAME	STATUS	SEX
Delphin	Artisanal miner	M	Kabanga Germain	Trader	M
Tshiyaze Kateng	Artisanal miner	M	Luke Luxor	Trader	M
Eric Mbanza	Artisanal miner	M	Venesa Mukaz	Trader	F
Tshiay wa Mpoyo	Artisanal miner	M	Angelique banza	Trader	F
Katengo Mujinga	Artisanal miner	F	Petit Petit	COMIAKOL, President	M
Fiston Kabamba	Artisanal miner	M	Alexis Mutombo	COMIAKOL, Vice President	M
Armel Ellen	Artisanal miner	F	Makonga	Artisanal miner	F
Jolie Nsamba	Artisanal miner	F	Mujinga beatrice	Artisanal miner	F
Mumbaki kindobwela	Artisanal miner	F	Mumabaki indobwela	Artisanal miner	F
Aimée Ngoy	Artisanal miner	F	Ngoy wa ilunga josé	Artisanal miner	F
Raphael Mbaya	PACT, Program Officer	M	Kilombo Alice	Community (Artisanal miner family)	F
Olivier Sabwa	PACT	M	Annie Wambuyi	Community	F
Herny Mpoyo,	SAEMAPE	M	Monique Katung	Community	F
Maleso Gaston	SAEMAPE	M	Kalenga Letitia	Community	F
Peter Amlande	SAEMAPE	M	Banza Luc	Community	M
Gilbert Kafita	Chemaf, in charge of business development	M	Kabwit Frank	Community	M
Jean Kyondwa	Chemaf, in charge of security	M	Michel Katung	Community	M
Josué Ngandu	Trader	M	Mujinga Charlene	Community	F
Bukasa Pablo	Trader	M	David Ilunga	Community	M
Musampa Samy	Trader	M	Shako Pamela	Community	F
Théthé Kapinga	Trader	F	Annie Masengo	Community	F
Julie Kalumba	Trader	F	Charles Ngoy	Community	M
Solange Thibala	Trader	F	Kalenga wa Kalenga	Community	M
Judith Mabwanji	Trader	F	Leon Rhabbi	Community	M
Ellen Kapinga	Trader	F	Fatuma	Community	F
Regine Kafut	Trader	F	Safi Manungu	Community	F
Christine Kapinga	Trader	F	Jolie Kabeya	Community	F
Julie Kapinga	Trader	F			

