

FINAL REPORT



Consultancy to assess factors and causes leading to poor occupational safety and health and working conditions in mining sector



October, 2023

## **LIST OF ACRONYMS**

DR: Desk Review  
EU: European Union  
FGDs: Focus Group Discussions  
GDP: Gross Domestic Product  
ILO: International Labour Organization  
KIs: Key Informant Interviews  
MIFOTRA: Ministry of Public Service and Labour  
NISR: National Institute of Statistics of Rwanda  
OSH: Occupational Safety and Health  
RMA: Rwanda Mining Association  
REWU: Rwanda Extractive Industry Workers Union  
RMB: Rwanda Mining, Gas and Petroleum Board  
RSSB: Rwanda Social Security Board  
SDGs: Sustainable Development Goals  
ToRs: Terms of Reference  
UN: United Nations  
WHO: World Health Organization.

## **LIST OF TABLES**

Table 1: Distribution of mining enterprises by their sizes

Table 2: Average level of risk by type of hazard

Table 3: Average level of compliance by legal requirement

Table 4: Specific recommendations.

## **LIST OF FIGURES**

Figure1: Summary of study design to assess OSH and Working conditions in Rwanda's Mining Sector

Figure 2: Risk evaluation matrix

Figure 3: Types of hazards with high level of risk

Figure 4: Types of hazards with medium level of risk

Figure 5: Legal requirements with high level of compliance

Figure 6: Legal requirements with medium level of compliance

Figure 7: Legal requirements with low level of compliance

## FOREWORD

Increasing productive employment and decent work is an important component of major development frameworks, including the Sustainable Development Goals (SDGs) (UN General Assembly, 2015), the International Labour Organization's (ILO) Decent Work Agenda (ILO, 2017), and the 2017 European Consensus on Development (EU Council of Ministers, 2017b).

The ILO reports that some 780 million women and men around the world are working but not earning enough to lift themselves and their families out of poverty (ILO, 2017a).

A sustainable path out of poverty relies not just on gaining work, but securing productive work that has long-term potential: that allows the worker to plan ahead, to establish a degree of financial security and social protection, and to settle in a location long enough to feel a sense of belonging and purpose. Ideally, employment should enhance a worker's sense of self-worth and provide opportunities for personal growth and satisfaction.

By contrast, exploitative working conditions can have deleterious impacts on workers and society as a whole. For instance, unsafe work practices can negatively impact the psychological and physical health of workers. These impacts can, in turn, place increased financial pressure on the state through greater demand for healthcare and social services. Exploitative working conditions can also keep workers and their families in financial poverty.

Mining remains one of the most hazardous employment sectors, despite the considerable efforts in many countries to implement and maintain occupational safety and health. The toll of death, injury and disease remains high amongst the world's mine workers. Much preventive work, in terms of health and safety, is still required.

The Country profile of 2019 indicated that, according to statistics from RMB, the number of occupational deaths in mining economic activity (80) in one year 2017/2018 are more than a quarter of occupational deaths registered by RSSB in all economic activities from 2012 to 2018.

RSSB reports showed that in the year 2021/2022, the number of fatal cases in mining and quarrying was 7 while the number of non-fatal cases was 68 and all of them were due to physical injuries.

The labour inspection report of 2022/2023 indicated that mining sector covered 66% of all occupational injuries which occurred in all economic activities.

In comparison with other economic activities, the above-mentioned statistics show that mining and quarrying is the economic activity at high risk.

The study revealed that out of 13 types of hazards assessed, six (6) of them equivalent to 46% have high level of risk and seven (7) of them equivalent to 54% have medium level of risk. Overall, the economic activity has an average level of risk of 15 putting it in high-risk category.

The following types of hazards with high level of risk need special attention:

- Falls of rock at the working face, the collapse of the working face and landslides

- Stripping/Slipping
- Heavy loads, awkward working positions, repetition, working under pressure
- Dust
- Noise
- Darkness.

Regarding compliance status, the study revealed that out of thirty-one (31) legal requirements assessed, six (6) of them equivalent to 19% have high level compliance, ten (10) of them equivalent to 32% have medium level of compliance and majority (15) of them equivalent to 48% have low level of compliance. Overall, the economic activity has an average level of compliance of 49.54% putting it in low compliance category.

The following legal requirements with low level of compliance need special attention:

- Availability of washrooms separate for men and women
- Hoist or lift which is of good mechanical construction and adequate strength and is maintained at least once in every six (6) months
- Availability of a passage for wheelchairs, guardrails and other devices that may serve as support passage for persons with disabilities
- Availability of an emergency plan which is in place and regularly revised based on the potential risks at workplace
- Employees' training on occupational health and safety matters at work at least once a year
- Employees' medical checkup at least once a year
- Conducting occupational safety and health risk assessment at least once a year
- Payment of employees' social security contributions to the social security organ in Rwanda
- Availability of occupational safety and health policy
- Issuance of written employments contracts to all employees who have exceed ninety (90) consecutive days in an enterprise
- Existence of occupational safety and health committee which is trained, have a register for occupational injuries recording and is functional
- Recording and reporting of occupational hazards, diseases and deaths to RSSB and labour inspection
- Payment of all employees' salaries through bank or in a recognized financial institution
- The availability of fire prevention and fire-fighting measures
- Availability of a written document indicating protective mechanisms and which is prepared in a clear and understandable language for employees, interns and apprentices and displayed at appropriate places.

In order to address the identified gaps, the following major areas need to be enhanced: compliance with laws and regulations; employees' participation through enhancing the functioning of OSH committees; awareness raising among employees, enhancing prevention culture through establishment of Organizational OSH policy and its implementation plan.

The implementation of the recommendations proposed under this assessment requires the commitment from all Stakeholders as well as individual and collective levels and I hope that all relevant parties will use the assessment as a knowledge base and an informative tool to inform necessary actions.

I therefore, call upon all actors for join forces to close the gaps revealed by the assessment findings and implement the proposed recommendations.

Particularly, I call upon employers to ensure compliance with Laws and Regulations and embrace OSH culture in order to make our workplaces conducive and productive.

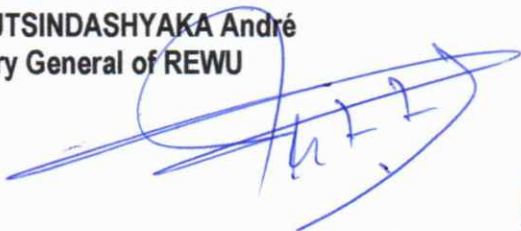
Furthermore, I call upon the Government especially the Ministry of Public Service and Labour and Districts to ensure that employers comply with Laws and Regulations.

As I conclude, I would like to express my heartfelt thanks to the Kingdom of Belgium through the Belgian Development Agency (Enabel) for the financial support which enabled us to conduct this important study through the existing partnership between REWU and Enabel Rwanda.

I also would like to extend my sincere thanks to all partners for their invaluable contributions towards the success of the conducted study.

**Done at Kigali, on 24<sup>th</sup> November 2023**

**Eng. MUTSINDASHYAKA André**  
**Secretary General of REWU**



## TABLE OF CONTENTS

0. EXECUTIVE SUMMARY .....	10
1. Background .....	10
2. Methodology .....	11
3. Study findings .....	12
4. Recommendations.....	13
I. INTRODUCTION ON THE STUDY .....	14
I.1. Background of REWU .....	14
I.2. Background of the study.....	14
I.3. Objective of the study.....	14
I.3.1. Main objective .....	14
I.3.2. Specific objectives .....	14
I.4. Scope of the study .....	15
I.5. Stakeholders' engagement .....	15
II. MINING SECTOR IN RWANDA.....	16
II.1. Background.....	16
II.2. Policy and legal framework .....	16
II.2.1. Policy framework.....	16
II.2.2. Legal framework .....	17
II.2.3. Institutional framework.....	18
III. WORKING CONDITIONS IN MINING SECTOR .....	19
III.1. Global perspective .....	19
III.1.1. General overview .....	19
III.1.3. Child labour .....	22
III.1.4. Gender inequality .....	22
III.2. Regional perspective.....	23
III.3. National perspective.....	24
III.3.1. Occupational injuries .....	24
III.3.1. Social security .....	25
III.3.2. Duration of jobs/Stability and job security of work .....	26
III.3.3. Employment income/Adequate earning .....	26
III.3.4. Child labour .....	27



III.3.5. Decent working time.....	27
III.3.6. Combining work with family responsibilities.....	27
IV. METHODOLOGY.....	28
IV.1. Introduction.....	28
IV.2. Study Design.....	28
IV.3. Methodological approach to assess OSH and working conditions in Rwanda's mining sector.....	29
IV.3.1. Study population.....	29
IV.3.2. Sampling strategy and sample size.....	29
IV.3.3. Types of data.....	30
IV.3.4. Assessment tools/Checklists design.....	30
IV.3.5. Cut off levels.....	31
IV.3.6. Data collection and analysis.....	31
IV.3.7. Ethical considerations.....	31
IV.3.8. Determining the level of risk and compliance.....	32
V. FINDINGS AND ANALYSIS.....	32
V.1. Introduction.....	32
V.2. Risk assessment.....	32
V.2.1. Table and figures summarizing the risk assessment findings.....	32
V.2.2. Economic activity risk status.....	34
V.3. Compliance assessment.....	34
V.3.1. Table and figures summarizing compliance assessment findings.....	35
V.3.2. Economic activity compliance status.....	38
VI. RECOMMENDATIONS.....	38
VI.1. Recommendations on enhancing law compliance.....	39
VI.2. Recommendations to address identified hazards and related risks.....	39
VII. BIBRIOGRAPHY.....	42

## 0. EXECUTIVE SUMMARY

### 1. Background

According to the ILO estimates, every year over 2.3 million women and men die at work from an occupational injury or disease. Over 350,000 deaths are due to fatal accidents and almost 2 million deaths are due to fatal work-related diseases. In addition, over 313 million workers are involved in non-fatal occupational accidents causing serious injuries and absences from work.

The ILO also estimates that 160 million cases of non-fatal work-related diseases occur annually. These estimates imply that every day approximately 6,400 people die from occupational accidents or diseases and that 860,000 people are injured on the job. Furthermore, as estimates show, work-related diseases represent the main cause of death at work, killing almost six times more workers than occupational accidents. This should highlight the need for a new paradigm of prevention: one that also focuses on work-related diseases, not only on occupational injuries.

The devastating effects on workers and their families cannot be fully calculated; however, the ILO has estimated the great economic burden of not investing in OSH so as to prevent occupational accidents and diseases. The total costs amount to approximately four per cent of the world's GDP per year (roughly 2.8 trillion US dollars).

With regard to mining sector, it remains one of the most hazardous employment sectors, despite the considerable efforts in many countries to implement and maintain occupational safety and health. The toll of death, injury and disease remains high amongst the world's mine workers. Much preventive work, in terms of health and safety, is still required.

Mining is still ranked high amongst the formal economy sectors for leading fatality rates in many countries. Where reliable national statistics exist, mining is the sector with the highest, or among the two to three highest, rates of fatal occupational accidents. Illnesses and injuries in the informal mining sector (artisanal, illegal and/or small-scale mining) are not represented in national records. Generally, it is estimated that the working conditions in informal mining are worse than those in the formal mining sector.

In Rwanda, RSSB statistics show that there was an increase in number of Occupational Injuries whereby occupational injuries shifted from 754 in fiscal year 2017/2018 to 1,467 in fiscal year 2022/2023. As result, the benefits paid have doubled within a period of 5 years.

The Country profile of 2019 indicated that, according to statistics from RMB, the number of occupational deaths in mining economic activity (80) in one year 2017/2018 are more than a quarter of occupational deaths registered by RSSB in all economic activities from 2012 to 2018.

RSSB reports showed that in the year 2021/2022, the number of fatal cases in mining and quarrying was 7 while the number of non-fatal cases was 68 and all of them were due to physical injuries.

The labour inspection report of 2022/2023 indicated that mining sector covered 66% of all occupational injuries which occurred in all economic activities.

In comparison with other economic activities, the above-mentioned statistics show that mining and quarrying is the economic activity at high risk.

## 2. Methodology

The study considered all mining enterprises namely: micro (1-3), small (4-30), medium (31-100) and large (100+) employees. According the NISR 2020 Establishment Census published in September 2021, the total number of enterprises is 242 distributed as follows: Micro=55, Small=129, Medium=33 and Large=25.

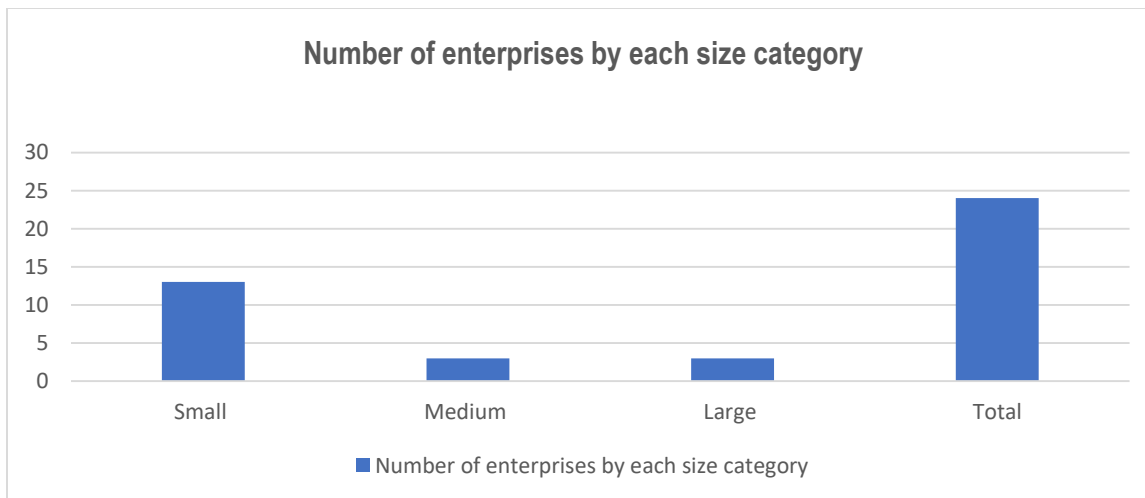
By applying Yamane's formula:  $n = N/(1+N(e)^2)$  for sample size calculation, the sample size of 24 enterprises was used in the study.

To ensure representativity of each category of enterprises in terms of their sizes, the sample size was proportionally distributed among micro, small, medium and large enterprises as per the table below:

**Table 1: Distribution of assessed enterprises scales**

Size	Number of enterprises by each size category
Small (4-30)	18
Medium (31-100)	3
Large (100+)	3
<b>Total</b>	<b>24</b>

**Figure 1: Distribution of assessed enterprises scales**



The study comprised two components namely compliance and risk assessments and checklists which were validated during the inception report validation meeting were used to conduct the assessment for each component.

For risk assessment, the checklists were developed by taking into account common OSH hazards for mining and quarrying economic activity. The checklist is in annex 1.

For each enterprise, the risk was evaluated by using the risk evaluation matrix below as per the risk assessment regulation, 2019 of the Ministry of Public Service and Labour.

For compliance assessment, the checklist was drawn from National instruments. This checklist is in annex2.

For compliance assessment, in order to evaluate the performance of each enterprise, the cut off levels considered are the one used by labour inspection and they are as follows:

- High=70%-100%
- Medium=50%-69%
- Low=0%-49%.

At enterprise and economic activity level, the level of risk and compliance were determined by calculating:

- The total score of types of hazards or compliance to legal requirements assessed
- The total number of types of hazards or compliance to legal requirements assessed
- The average level of risk/compliance by dividing the total score by the number of elements assessed.

For risk assessment, the cut off levels considered are as per the risk assessment regulation, 2019 of the Ministry of Public Service and Labour. Where:

- High=15-25
- Medium=5-14
- Low=1-4.

At enterprise and economic activity level, the level of risk and compliance were determined by calculating:

- The total score of types of hazards or compliance to legal requirements assessed
- The total number of types of hazards or compliance to legal requirements assessed
- The average level of risk/compliance by dividing the total score by the number of elements assessed.

### **3. Study findings**

The study revealed that out of 13 types of hazards assessed, six (6) of them equivalent to 46% have high level of risk and seven (7) of them equivalent to 54% have medium level of risk. Overall, the economic activity has an average level of risk of 15 putting it in high-risk category.

The following types of hazards with high level of risk need special attention:

- Falls of rock at the working face, the collapse of the working face and landslides
- Stripping/Slipping
- Heavy loads, awkward working positions, repetition, working under pressure
- Dust
- Noise
- Darkness.

Regarding compliance status, the study revealed that out of thirty-one (31) legal requirements assessed, six (6) of them equivalent to 19% have high level compliance, ten (10) of them equivalent to 32% have medium level of compliance and majority (15) of them equivalent to 48% have low level of compliance. Overall, the economic activity has an average level of compliance of 49.54% putting it in low compliance category.

The following legal requirements with low level of compliance need special attention:

- Availability of washrooms separate for men and women
- Hoist or lift which is of good mechanical construction and adequate strength and is maintained at least once in every six (6) months
- Availability of a passage for wheelchairs, guardrails and other devices that may serve as support passage for persons with disabilities
- Availability of an emergency plan which is in place and regularly revised based on the potential risks at workplace
- Employees' training on occupational health and safety matters at work at least once a year
- Employees' medical checkup at least once a year
- Conducting occupational safety and health risk assessment at least once a year
- Payment of employees' social security contributions to the social security organ in Rwanda
- Availability of occupational safety and health policy
- Issuance of written employments contracts to all employees who have exceed ninety (90) consecutive days in an enterprise
- Existence of occupational safety and health committee which is trained, have a register for occupational injuries recording and is functional
- Recording and reporting of occupational hazards, diseases and deaths to RSSB and labour inspection
- Payment of all employees' salaries through bank or in a recognized financial institution
- The availability of fire prevention and fire-fighting measures
- Availability of a written document indicating protective mechanisms and which is prepared in a clear and understandable language for employees, interns and apprentices and displayed at appropriate places.

#### **4. Recommendations**

In order to address the identified gaps, the following major areas need to be enhanced: compliance with laws and regulations; employees' participation through enhancing the functioning of OSH committees; awareness raising among employees, enhancing prevention culture through establishment of Organizational OSH policy and its implementation plan.

In addition, identified major areas with high risk namely: Falls of rock at the working face, the collapse of the working face and landslides; Stripping/Slipping; Heavy loads, awkward working positions, repetition, working under pressure; Dust and Noise should be treated with very high urgency.

## **I. INTRODUCTION ON THE STUDY**

### **I.1. Background of REWU**

Rwanda Extractive Industry Workers Union (REWU) established in 2014, is a Rwandan trade union, which organizes all workers in Mining and Quarry Companies and cooperatives in Rwanda and was published in Rwanda Official Gazette No. 49 Bis of 08/12/2014.

The mission of REWU is to provide ways to bring together workers of extractive industry, to defend their interests and living conditions.

REWU's vision is to empower workers and their families, beneficiaries of mining fruits by improving the quality of their lives along with contributing to the attainment of social justice and sustainable development in an atmosphere of democracy and solidarity.

### **I.2. Background of the study**

In the framework of promoting workers' labor rights and social dialogue, REWU is partnering with Belgian Development Agency (Enabel) to implement the intervention: The Thematic Portfolio for Decent work and Social Protection in Rwanda. Thematic Portfolio aims at enabling young people and women of working age to engage in decent work, to be better protected by labor laws and standards and to benefit from social protection and more inclusive social dialogue.

In line with the above, REWU has set out a number of activities to implement the intervention and they include assessing factors and causes leading to poor occupational safety and health and working conditions in mining sector in order to inform subsequent actions.

In this regard, REWU has hired LevelMax to perform the above-mentioned study.

### **I.3. Objective of the study**

#### **I.3.1. Main objective**

The main objective of the study is to assess factors and causes leading to poor occupational safety and health and working conditions in mining and quarrying economic activity.

#### **I.3.2. Specific objectives**

The study has the following specific objectives:

- Assess the status of occupational safety and health in mining sector which will include risk and related causes and factors as well as compliance with relevant standards
- Assess the status of working conditions in mining sector which will include general decent work conditions.

- Propose the action plan and recommendations for improving occupational safety and health and working conditions in mining sector.

#### **I.4. Scope of the study**

In order to achieve study objectives mentioned above, the consultant shall have to:

- Conduct field assessment among mining establishments;
- Conduct sectoral occupational safety and health risk assessment
- Conduct sectoral working conditions' compliance assessment
- Conduct an extensive review of existing policies, strategies and laws to inform the study
- Conduct Key Informant Interviews (KIIs) among Trade Unions, Employers Organizations and relevant Government Institutions
- Conduct a desk review on similar or related assessments for international and National benchmarking and best practices
- Develop study report taking into account specific areas which the study aims to address
- State the recommendations of the study.

#### **I.5. Stakeholders' engagement**

Stakeholders' engagement in this study is important and inevitable and they include Government, Employees' and Employers' Organizations as well as mining and quarrying enterprises.

Stakeholders will be engaged at different levels of the study including inception report, data collection, report validation and dissemination of study findings.

## **II. MINING SECTOR IN RWANDA**

### **II.1. Background**

Mining in Rwanda started in the early 1930s and since then the mining sector has undergone wide reforms and is now Rwanda's second-largest export revenue earner in the country. In 2017, the sector generated \$373.4 Million of foreign exchange.

Rwanda's mineral resources include Cassiterite, Coltan, wolfram, peat (used for electricity generation or processed as an alternative for firewood), gold and Nickel. In addition to this, the country has other precious stones such as amphibolite, granites, quartzite, volcanic rocks, clay, sand and gravel.

Rwanda produces between 8,000 and 9,000 tons of mineral compounds every year and the amount of money depends on the market pricing dynamics. Gold mining and export has recently emerged to have big potential.

Rwanda is among the top producers of Tantalum, producing about 9% of the world's Tantalum used in electronics manufacturing.

In addition to that, Rwanda is now home to two refineries of gold and tin, both of which have the capacity to process large amounts of minerals from within the country and the region.

Rwanda has a mineral tagging and sealing scheme, internationally recognized as a member of the iTSCi program that ensures that the origins of the minerals can be traced in order to avoid conflict financing, human rights abuses, or other malpractices such as bribery in mineral supply chains.

According to the establishment census 2020 published in 2021, the total number of enterprises in mining and quarrying is 240 mainly processing cassiterite, gold and coltan of which 109 are formal and 131 are informal.

The same census revealed that the industry employes 15,794 employees where 13,494 are male and 2,300 are female.

The census also indicated that Micro and Small Mining cover 184 out of 242 mining establishments in Rwanda which is equivalent to 76%.

### **II.2. Policy and legal framework**

#### **II.2.1. Policy framework**

Below are key policies for mining sector:

- National Upstream Petroleum Policy for Rwanda
- Fiscal Policy for Petroleum exploration and Production
- Decent Work Country Program, 2018
- National Employment Policy, 2019



- National policy on elimination of child labour
- National occupational safety and health policy.

## **II.2.2. Legal framework**

Below is key legal framework for mining sector:

### **i) Laws**

- Law n°13/2016. of 02/05/2016 governing Petroleum exploration and production activities
- Law on mining and quarry operations adopted in 2018
- Law on minerals tax adopted in 2013
- Law establishing Rwanda Mines, Petroleum and Gas Board adopted in 2017
- Law N° 66/2018 of 30/08/2018 regulating labour in Rwanda
- Law N° 05/2015 of 30/03/2015 governing the organization of pension schemes
- Law N° 06/2003 of 22/03/2003 modifying and completing the Decree Law of August 22, 1974 concerning organization of social security
- Law N°003/2016 of 30/03/2016 establishing and governing maternity leave benefits scheme.

### **ii) Orders**

- Presidential order N° 028/01 of 18/05/2023 governing Rwanda Mines, Petroleum and Gas Board
- Ministerial Order No 007.01 of 19.07.2019 repealing Ministerial Orders related to mining and quarry operations
- Prime minister's order n° 079/03 of 26/07/2019 determining the structure and functioning of the Committee in charge of assessment of applications for licences and disputes related to mining and quarry operations.
- Ministerial order n° 013/MOJ/ag/19 of 16/07/2019 determining requirements for granting authorisation to import, manufacture, transport, trade in and use dynamites in mining and quarry operations.
- Ministerial order n°002/MINIRENA/2015 of 24/04/2015 on criteria used in categorisation of mines and determining types of mines
- Ministerial Order on occupational safety, employees' and employers' organisations, child employment, employment of a foreigner and circumstantial leave
- Ministerial Order n° 01/MIFOTRA/23 of 13/06/2023 on working hours and public servants governed by employment contracts
- Ministerial Order n° 001/19.20 of 17/03/2020 relating to labour inspection
- Ministerial Order n° 003/19.20 of 17/03/2020 relating to employees' representatives.

### **iii) Guidelines**

- General service providers
- Essential service providers
- Application form for small-scale, medium scale and large-scale mining license renewal
- Application form for small-scale, medium scale and large-scale mining license

- Application form for application for renewal of industrial quarry license, commercial small-scale quarry license or non-commercial quarry license
- Application form for Exploitation of industrial quarry license, commercial small-scale quarry license and non-commercial quarry license
- Application form for provision of general services
- Application form for a mineral processing license
- Application form for a mineral trading license
- Application Form for Exploration License Renewal
- Guidelines on Anti-Money Laundering
- Requirements to use explosives
- Requirements on environmental protection to guide mining and quarry operations.

### **II.2.3. Institutional framework**

Rwanda Mines, Petroleum and Gas Board (RMB). Its responsibilities include:

- implementing mining (and petroleum and gas) policies, laws and strategies;
- monitoring and coordinating the implementation of strategies relating to mines, petroleum and gas; and
- supervising and monitoring private and public entities conducting mining, trade and other mineral operations.

Other institutions play key roles in the sector, such as the following:

- Rwanda Development Board: This is in charge of:
  - facilitating investment;
  - negotiating on strategic projects;
  - issuing investment certificates; and
  - providing related incentives.
- Rwanda Environment Management Authority: This is in charge of:
  - setting and enforcing environmental standards;
  - inspecting mining projects; and
  - rehabilitating exhausted mines and quarries.
- Ministry of Public Service and Labour: This is in charge of:
  - setting the policy and regulatory framework
  - ensuring law enforcement through labour inspection
  - coordinating stakeholders' actions.
- Local authorities (districts and sectors): These can issue non-commercial quarry licences and small-scale quarry licences at the district and sector level.

### **III. WORKING CONDITIONS IN MINING SECTOR**

#### **III.1. Global perspective**

##### **III.1.1. General overview**

Extraction of minerals has been in existence since prehistoric time, in many parts of the world. Today, mining exists in most countries. Mining techniques can be divided into two common excavation types: surface mining and underground mining.

Increasing productive employment and decent work is an important component of major development frameworks, including the Sustainable Development Goals (SDGs) (UN General Assembly, 2015), the International Labour Organization's (ILO) Decent Work Agenda (ILO, 2017), and the 2017 European Consensus on Development (EU Council of Ministers, 2017b).

Work that is safe, stable and fairly compensated allows workers to extend the benefits of a steady income and new skillsets to their families and communities. This is why creating sustainable jobs for the local population is seen as "investing in [a state's] own future" (Barsukov, VP Supply Chain Management at Cameco Corporation, cited in Darychuk, & Travers, 2016).

##### **III.1.2. The burden of inadequate occupational safety and health conditions**

###### **i) General overview**

According to the ILO estimates, every year over 2.3 million women and men die at work from an occupational injury or disease. Over 350,000 deaths are due to fatal accidents and almost 2 million deaths are due to fatal work-related diseases. In addition, over 313 million workers are involved in non-fatal occupational accidents causing serious injuries and absences from work.

The ILO also estimates that 160 million cases of non-fatal work-related diseases occur annually. These estimates imply that every day approximately 6,400 people die from occupational accidents or diseases and that 860,000 people are injured on the job. Furthermore, as estimates show, work-related diseases represent the main cause of death at work, killing almost six times more workers than occupational accidents. This should highlight the need for a new paradigm of prevention: one that also focuses on work-related diseases, not only on occupational injuries.

The devastating effects on workers and their families cannot be fully calculated; however, the ILO has estimated the great economic burden of not investing in OSH so as to prevent occupational accidents and diseases. The total costs amount to approximately four per cent of the world's GDP per year (roughly 2.8 trillion US dollars).

###### **ii) Accidents' risk and prevalence**

With regard to mining sector, it remains one of the most hazardous employment sectors, despite the considerable efforts in many countries to implement and maintain occupational safety and health. The toll of death, injury and disease remains high amongst the world's mine workers.

Mining is still ranked high amongst the formal economy sectors for leading fatality rates in many countries. Where reliable national statistics exist, mining is the sector with the highest, or among the two to three highest, rates of fatal occupational accidents. Illnesses and injuries in the informal mining sector (artisanal, illegal and/or small-scale mining) are not represented in national records. Generally, it is estimated that the working conditions in informal mining are worse than those in the formal mining sector.

Over and above accidents, many of the adverse health effects associated with mining and the extractive industries are caused by the inhalation of airborne pollutants which are not controlled at source. Furthermore, mining include heavy work, exposure to toxic chemicals, noise, vibration, heat and cold stress, work at high altitude, shift work, etc.

Miners in the smallest underground mines typically work in unsupported tunnels, drilling and removing rock with hand tools and carrying the ore to the surface in sacks. The most common accidents are trips or falls, being hit by machinery or a moving object, and cave-ins or rock falls. The biggest health risks are exposure to dust (silica dust causes silicosis, particularly in gold miners), mercury and other chemicals; the effects of noise and vibration, poor ventilation (heat, humidity, lack of oxygen) and overexertion; inadequate work space; and the incorrect use of equipment which may not be fit for purpose.

Other commonplace health issues include poor sanitation and lack of clean water, malaria, typhoid, dysentery, malnutrition, substance abuse, tuberculosis (TB), and sexually-transmitted infections (STIs), including the Human Immunodeficiency Virus (HIV) that can lead to acquired immunodeficiency syndrome (AIDS). These can reach epidemic proportions when make-shift camps arise, for instance in 'gold rush' mining.

Mining accidents may be caused by gas or dust explosions, gas intoxications, improper use of explosives, electrical faults, fires, collapse of mine structures, rock falls from roofs and side walls, flooding, workers stumbling/slipping/falling, malfunctioning or improperly used mining equipment, or risks related to transport (including rail equipment and trackless machinery). Fatigue, as a consequence of long working hours, may constitute an accident risk, not least in transport work. In many countries, the rates of accidents, including fatal accidents, have been reduced in the last few decades. Most deaths in mining nowadays occur in rural parts of low-income countries.

The decreasing number of fatalities in formal mining is accompanied by decreasing fatality and accident rates, due partly to improved safety measures. However, mining is still ranked high amongst the formal economy sectors for leading fatality rates in many countries. Where reliable national statistics exist, mining is the sector with the highest, or among the two to three highest, rates of fatal occupational accidents. Illnesses and injuries in the informal mining sector (artisanal, illegal and/or small-scale mining) are not represented in national records. Generally, it is estimated that the working conditions in informal mining are worse than those in the formal mining sector. Most occupational hazards in informal mining are a consequence of poor physical conditions, such as ground failure and shaft collapses, although machinery accidents, poor lighting and ventilation, electrocution and explosive misuse, are also pervasive issues.

Women, men and children who work in artisanal small scale mining face additional illness, injury and stress from dust and noise pollution, extreme exertion from highly labor-intensive jobs, and stress caused by economic and other pressures. Although accidents are under-reported in artisanal small-scale mining, the ILO states that the number of non-fatal accidents in artisanal small-scale mining is still six to seven times greater than in formal, large-scale operations.

Globally, occupational carcinogens are an important cause of death and disability. Industries and occupations with large numbers of cancer deaths and registrations include but are not limited to mining industry. Numerous studies have shown associations between lung cancer and various exposures during mining activities.

Occupationally-induced cancer usually occurs decades after the start of the exposure that caused the cancer. The long latency of some cancers means that the numbers of deaths due to past high exposures will continue to be substantial into the future.

Silicosis and lung cancer are the main silica-related diseases in mining workforces. There is a link between silica dust, silicosis and lung cancer. Workers in underground mines are particularly at risk, since the silica component in the rock is usually high. There is good evidence that prolonged exposure to crystalline silica increases the risk of lung cancer.

Synthetic mineral fibres are classified by the International Agency for Research on Cancer (IARC) as being possible human carcinogens, hence exposure to synthetic mineral fibres may predispose to the development of lung cancer.

Underground exposure to radon gas and diesel engine exhaust fumes are other likely causes of lung cancer. Radon daughter exposure in underground mining has increased the risk of lung cancer, but can now be controlled by appropriate mine ventilation.

Underground exposure to radon gas and diesel engine exhaust fumes are other likely causes of lung cancer. Exposure to diesel exhaust fumes (consisting of diesel particulate matter, carbon monoxide, carbon dioxide, oxides of nitrogen and polycyclic aromatic hydrocarbons) occurs mainly in underground mines because of the use of diesel-powered mobile equipment for drilling and haulage, in confined spaces where there is limited dilution of emissions via natural ventilation. Diesel emission levels are dependent on the fuel quality (the best quality fuel contains low sulphur levels), and also on the type of engine used and the effectiveness of exhaust filter systems deployed.

Diesel particulate matter (DPM) has been classified as a Group 1 Carcinogen by IARC and there is an international awareness and need for improved DPM risk management. Several epidemiological studies from other industries indicate that there is an excess risk of lung and bladder cancer from exposure to DPM. In surface mining operations, ultraviolet radiation from the sun is likely to increase the risk of developing skin cancer (squamous cell and basal cell carcinomas), and is potentially an important skin cancer risk factor.

Various studies in the USA, China and Spain have provided evidence of increased risk of certain cancers (e.g. cancers of the respiratory, digestive and haematologic systems, and the thyroid) in the proximity of different types of mining facilities, due to both occupational and environmental exposures.

The human health impacts associated with exposure to toxicants in artisanal mining populations in low-income countries are well recognized. Metalloids such as arsenic, a known carcinogen, and heavy metals such as lead, mercury and cadmium, are well-researched, naturally-occurring pollutants of which environmental levels continue to increase in artisanal mining communities.

Gibb and O'Leary identified a number of studies reporting on health assessments, kidney dysfunction, neurological disorders and symptoms, and immunotoxicity/autoimmune dysfunction in individuals living in or near artisanal mining communities. These studies, conducted in 19 different countries in South America, Asia, and Africa, measured hair and urine concentrations of mercury well above WHO health guidance values in artisanal mining communities.

### **III.1.3. Child labour**

Child labour is illegal in most African countries that have ratified the ILO Convention on the Rights of the Child. On the other hand, with a growing proportion of Africans under the age of 15 and many living in abject poverty, the number of AIDS orphans is rising. A general lack of monitoring means that opportunities to exploit children are considerable. Hence, child labour is unfortunately still prevalent in the ASM sectors of many Africa countries and attitudes towards the issue ambivalent.

Children work in the mines to help their parents, and to supplement the family income in order to buy basic goods and survive. Since much of the work is physically hard, they may not be fully involved at first although as they grow older there is an increase the scope of their activities. Children working in ASM operations are not only exposed to immediate risk but they are also jeopardising their long-term development both physically and mentally. This labour is perpetuated due to:

- A lack of opportunities or incentives to go to school.
- No prospects or regular employment.
- No coordinated effort to stop child labour.
- A lack of law enforcement.
- A lack of improved ASM performance.

Remember the unfortunate truth is that despite our best intentions, we have so far failed to really change this situation. Although there is no quick fix solution to child labour, we must all strive to raise awareness, and aim to have more stringent law enforcement and monitoring of the sector. This should be coupled with the generation of alternative income opportunities, family support service and the provision of affordable and accessible education.

### **III.1.4. Gender inequality**

Over time, women's involvement in mining activities has tended to increase, particularly in Africa. Women are engaged in most aspects of ASM and are also involved in ancillary activities resulting from the prevalence of family-based activity in Africa (45 - 50% of all ASM workers in Africa are women).

Although many African constitutions protect their position many women still work under indecent work conditions. Future policy in Africa must focus more sharply on removing gender-based constraints and incorporate ways that allow women to enjoy their rights in accordance with the ILO Convention on the Elimination of All Forms of Discrimination against Women.

### III.2. Regional perspective

Africa is home to about 30 per cent of the world's total mineral reserves and a significant share of the global production of economically important minerals and metals. In many sub-Saharan African countries, the mining sector makes an important contribution to foreign exchange earnings, government revenues, employment and gross domestic product.

In Africa, studies on the mining industry showed that miners' exposure to harmful chemicals, dust, inadequate ventilation were conditions that potentially led to several health issues, particularly respiratory disorders (Ayaaba et al. 2017). Other factors such as non-use of protective clothing, long working hours, work pressure (Boniface et al. 2013; Chimamise et al. 2013; Long et al. 2015), lack of knowledge on risks associated with the use of harmful chemicals particularly among artisanal and small and medium scale miners (Armah et al. 2016) were also found to play a role in increasing injuries and accidents among miners. Studies have also showed that excessive noise levels in the mines (Chadambuka et al. 2013) was associated with injuries and accidents that occur in the mining sector. In addition, Ajith and Ghosh (2019) found that job stress and dissatisfaction, drug usage, poor management and supervision, and poor work conditions were common triggers of accidents, injuries and fatalities among small-scale miners.

Work-related threats to human health and life are becoming increasingly evident. A study of workers in gold mining in an east African country reported abnormally high concentrations of total mercury in the urine samples of miners exposed to mercury vapour during burning of gold-mercury amalgams. In the same country, there were injury rates between 10 and 18 per 1 000 workers in mining, building and construction industries.

Michelo et al (2009) reported 165 injuries and 20 fatalities from January 2005 to May 2007 in one of the largest copper mining in Zambia. The incidence of injury remains high although some improvements in work conditions have been made as a result of catastrophic events and scientific progress. Higher rates of injuries and fatalities have been reported for low-income countries in Africa and Asia compared to Europe and America, in Sub-Saharan Africa for example, more than 54000 fatal occupational accidents happen annually compared to 16000 fatal occupational accidents in Europe and America.

In 2001, a survey conducted by the WHO Regional Office in Africa showed the lack of comprehensive occupational health services for workers in the Region in spite of various efforts put in place. Policies and legislation on occupational health and safety do indicate a commitment to workers' health. The regional survey showed that 48% of the countries have occupational health legislation and 37% have legislation pertaining to labour and health, but in both cases there is lack of adequate human resources to monitor applications.

### III.3. National perspective

#### III.3.1. Occupational injuries

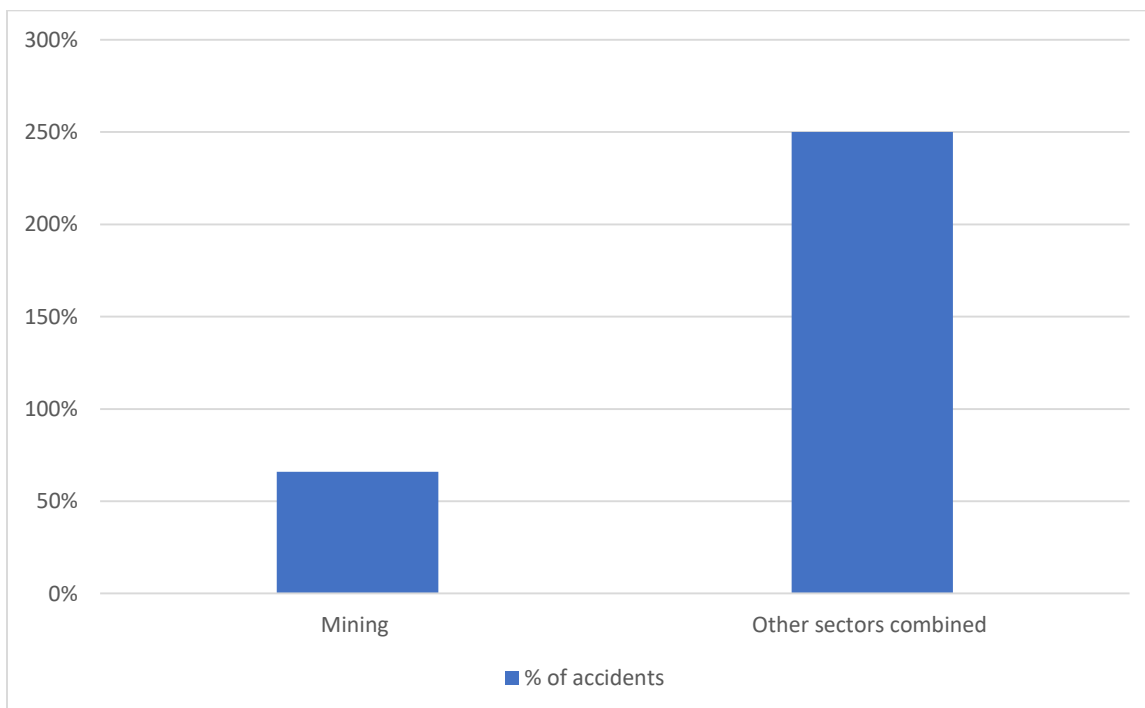
In Rwanda, RSSB statistics show that there was an increase in number of Occupational Injuries whereby occupational injuries shifted from 754 in fiscal year 2017/2018 to 1,467 in fiscal year 2022/2023. As result, the benefits paid have doubled within a period of 5 years.

The Country profile of 2019 indicated that, according to statistics from RMB, the number of occupational deaths in mining economic activity (80) in one year 2017/2018 are more than a quarter of occupational deaths registered by RSSB in all economic activities from 2012 to 2018.

The labour inspection report of 2022/2023 indicated that mining sector covered 66% of all occupational injuries which occurred in all economic activities.

In comparison with other economic activities, the above-mentioned statistics show that mining and quarrying is the economic activity at high risk.

**Figure 4: The status of occupational accidents in Rwanda**



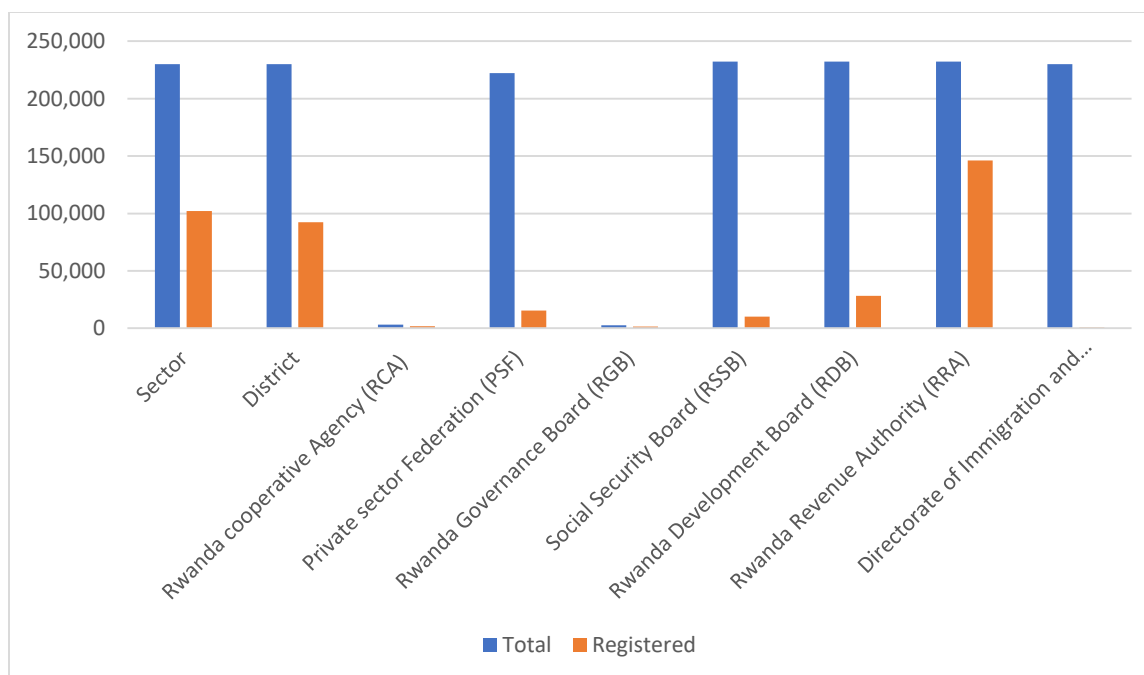


### III.3.1. Social security

**Table 2: Level of registration of Enterprises registered at different administrative and public/private authorities**

REGISTRATION LEVEL	Total	Registered	Percent
Sector	229,926	102,146	44.4
District	229,926	92,234	40.1
Rwanda cooperative Agency (RCA)	3,272	1,786	54.6
Private sector Federation (PSF)	222,123	15,509	7.0
Rwanda Governance Board (RGB)	2,458	1,594	64.8
Social Security Board (RSSB)	232,143	10,223	4.4
Rwanda Development Board (RDB)	232,143	28,229	12.2
Rwanda Revenue Authority (RRA)	232,146	146,039	62.9
Directorate of Immigration and Emigration (DGIE)	229,926	730	0.3

**Figure 2: Level of registration of Enterprises registered at different administrative and public/private authorities**



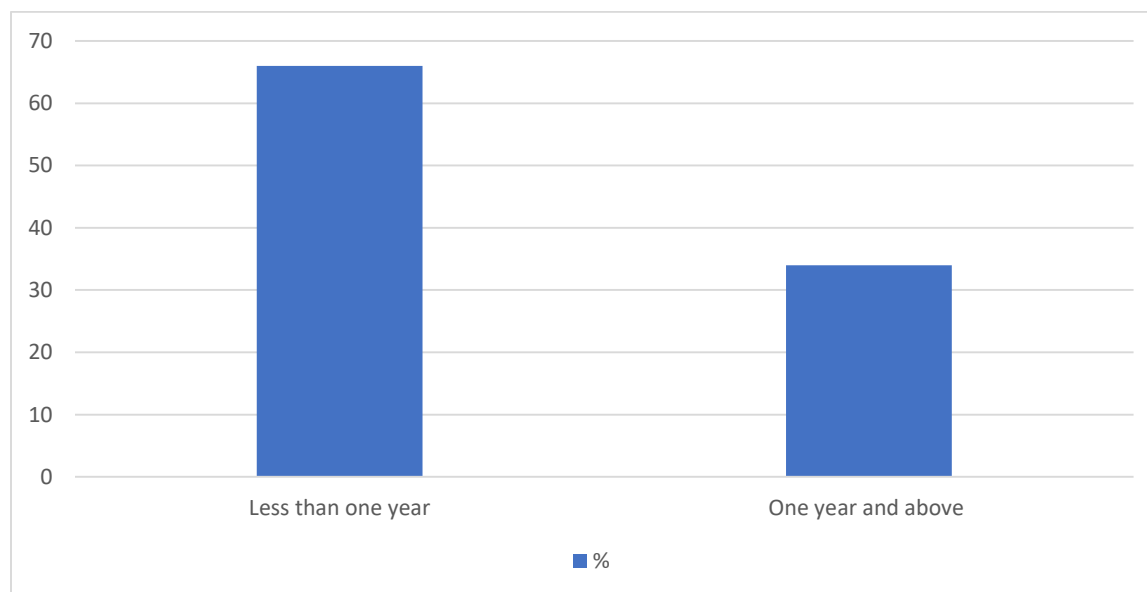
The table and figure above show the registration deficits at all levels and one of the biggest deficits being at Rwanda Social Security Board where only 10,223 (4.4%) enterprises are registered at the Institution. This simply translates into a serious gap in terms of social security to workers.

### III.3.2. Duration of jobs/Stability and job security of work

According to EICV5, the results show that only 34% of all jobs carried out 12 prior to EICV5 survey, were occupying their holders during all 12 months. Other 34% of jobs lasted 6 months or less while 22% lasted between 7 and 11 months. More specifically, the duration of all jobs was 17%, 27.1% and 21.9% for the period of less than 3 months, 3 to 6 months and 7 to 11 months respectively.

Therefore, EICV5 data translates that 66% of workers are in employment of less than one year. These workers who are in employment of shorter duration are mostly in either informal economy or working informally in formal economy. Statistics also show the fragility of employment among these workers which has a negative impact on their stability and security at work as well as their relationship with financial services. Legal enforcement focusing on addressing practices and factors behind non issuance of written employment contracts and short-term contracts where they are given, should be strengthened.

**Figure 3: Duration of jobs**



### III.3.3. Employment income/Adequate earning

The income from employment received by workers in non-farm main jobs was more than 3 times higher than the income for workers engaged in wage farming activities as main job.

The working poverty rate remained the highest at 46.5% among workers engaged in elementary occupation and it has slightly increased by 1 percentage point from EICV4.

Working poverty rate is also higher among skilled agriculture, forestry and fishery workers, however, it has significantly decreased by around 4 percentage point from 38% in EICV4 to 34% in EICV5. The next occupation for which the working poverty rate is relatively higher is “Craft and related trade” whereby it was 23% in EICV5.

Therefore, statistics from EICV5 show that working poverty status is higher among economic activities where informal working settings are predominant. Measures aiming at tackling the working poverty status which is prevalent in informal economy dominated economic activities should be strengthened.

### **III.3.4. Child labour**

EICV5 indicates that the bulk of working children was engaged in Agricultural activities (70%) and 25% of them were engaged in service sector.

On child labour, the bulk of child laborers were engaged in service sector (58%) followed by those engaged in agriculture sector (31%). The big proportion of child laborers who were studying was involved in agriculture activity (51%) while the big proportion of those who were not studying was involved in services. Laborers who were studying was involved in agriculture activity (51%) while the big proportion of those who were not studying was involved in services.

Considering that among agriculture activities informal establishments represent 61.5%, EICV5 data indicates that child work and child labour is more prevalent in informal sector compared to formal sector. The same trend is also true for service sector.

### **III.3.5. Decent working time**

According to EICV5, on average, a worker in Rwanda spent 32 hours per week in economic activities during EICV5. Workers in non-farm jobs spent much time at work than those engaged in farm-activities. According to EICV5 results, salaried workers in wage non-farmers spent 50 hours per week in their work on average, while independent non-farm and contributing family workers spend 47 and 44 hours per week respectively. On the other hand, wage farm workers and independent farmers spent an average of 29 and 25 hours per week respectively.

If, according to EICV5 results, salaried workers in wage non-farmers spent 50 hours per week in their work on average while the legal working hours is 45 hours per week, this calls for more investigation to assess underlying factors and workers' compensations in this case.

Male workers are more likely to spend more time in economic activities than females in general. At the national level, the average time spent by females was 28 hours per week which is lower than the average time spent by males (37 hours per week). Except for wage non-farm job whereby females spent more time than males at work, in other type of jobs, the average number of hours spent by males in economic activities is higher.

### **III.3.6. Combining work with family responsibilities**

While time spent at work contributes a lot in combining work, family and personal life, it is not the sole factor. There are other parameters including the awareness around this concept and for any measure to tackle this challenge to be successful, it is important to address all its contributing factors from a socio-economic perspective.

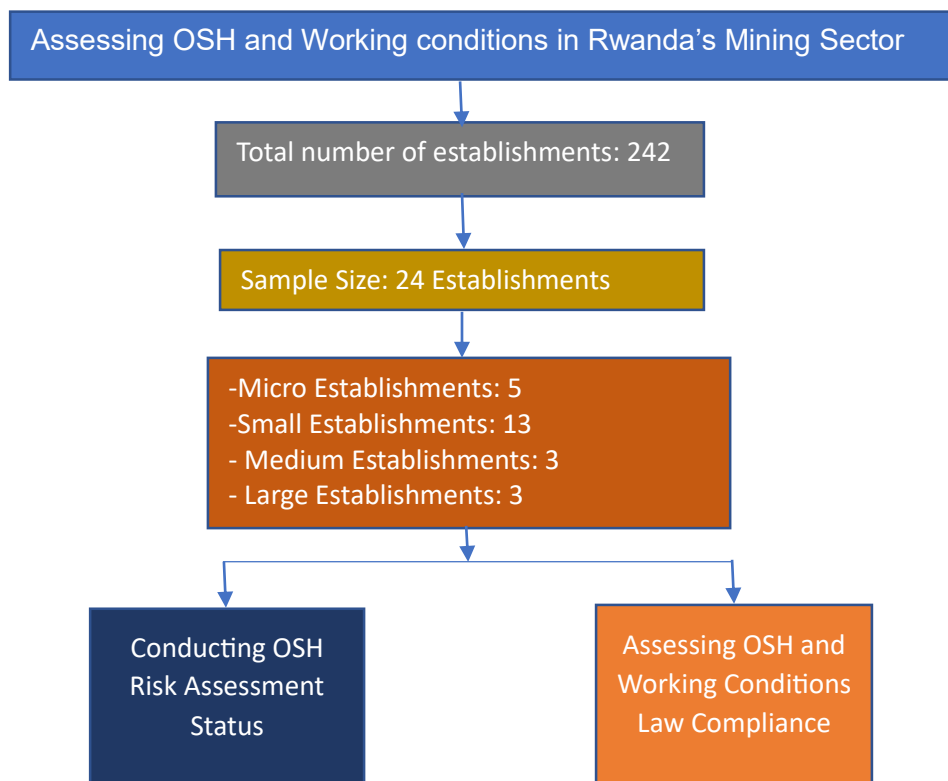
## IV. METHODOLOGY

### IV.1. Introduction

The methodological approach describes how the study was approached. It describes the study design, the general methodological approaches and step by step approach to implement each deliverable.

### IV.2. Study Design

**Figure 5: Summary of study design to assess OSH and Working conditions in Rwanda's Mining Sector**



### IV.3. Methodological approach to assess OSH and working conditions in Rwanda’s mining sector

#### IV.3.1. Study population

Considering mining landscape in Rwanda, the assessment focused on small, medium and large mining enterprises. According the NISR 2020 Establishment Census published in September 2021, the total number of these enterprises is 187.

#### IV.3.2. Sampling strategy and sample size

The formula to be used for sample size calculation is Yamane's formula:  $n = N/(1+N(e)^2)$ .

Where: n = the sample size; N = the population of the study; e = the margin error in the calculation=0.19

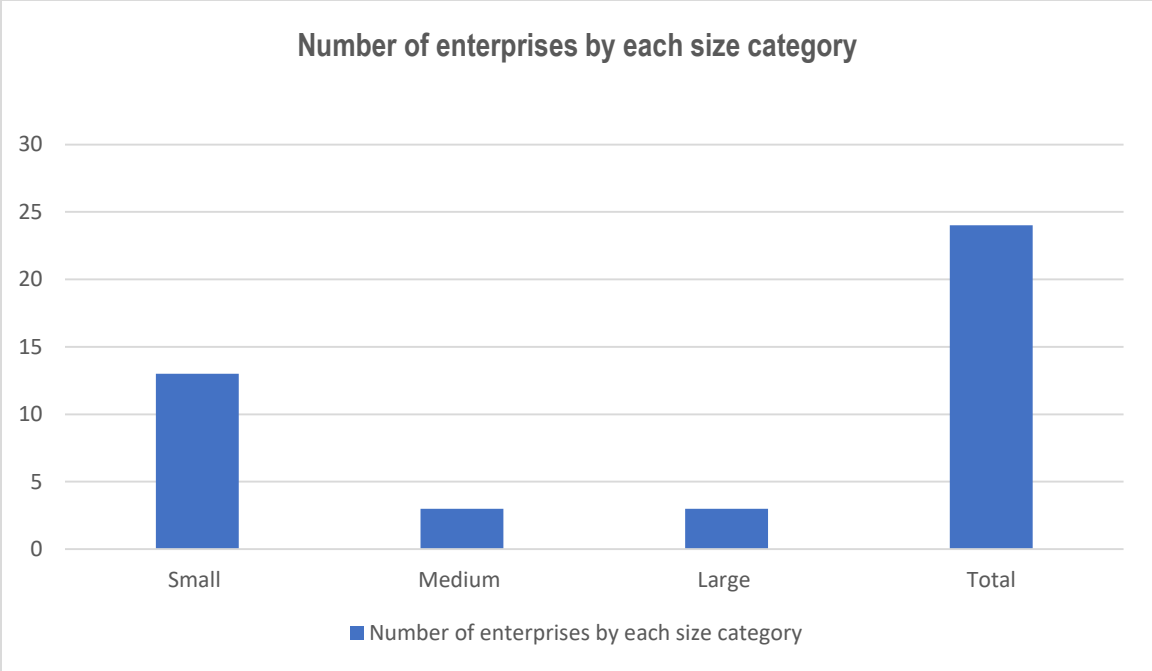
By applying the formula above, the sample size of 24 enterprises will be used in the assessment.

To ensure representativity of each category of enterprises in terms of their sizes, the sample size was proportionally distributed among micro, small, medium and large enterprises as per the table below:

**Table 3: Distribution of assessed mining enterprises by their sizes**

Size	Number of enterprises by each size category
Small (4-30)	18
Medium (31-100)	3
Large (100+)	3
<b>Total</b>	<b>24</b>

**Figure 6: Distribution of assessed mining enterprises by their sizes**



**IV.3.3. Types of data**

Generally, two types of data namely qualitative and quantitative data were collected. Qualitative data were collected by employing desk review (DR) and key informant interviews (KIIs) while quantitative data were collected by using questionnaire guides.

**IV.3.4. Assessment tools/Checklists design**

The study comprised two components namely compliance and risk assessments and checklists which were validated during the inception report validation meeting were used to conduct the assessment for each component.

For risk assessment, the checklists were developed by taking into account common OSH hazards for mining and quarrying economic activity. The checklist is in annex 1.

For each enterprise, the risk was evaluated by using the risk evaluation matrix below as per the risk assessment regulation, 2019 of the Ministry of Public Service and Labour.

**Figure 7: Risk evaluation matrix**

		Impact				
		Trivial	Minor	Moderate	Major	Extreme
Probability	Rare	Low	Low	Low	Medium	Medium
	Unlikely	Low	Low	Medium	Medium	Medium
	Moderate	Low	Medium	Medium	Medium	High
	Likely	Medium	Medium	Medium	High	High
	Very likely	Medium	Medium	High	High	High

For compliance assessment, the checklist was drawn from National instruments. This checklist is in annex2.

#### IV.3.5. Cut off levels

For compliance assessment, in order to evaluate the performance of each enterprise, the cut off levels considered are the one used by labour inspection and they are as follows:

- High=70%-100%
- Medium=50%-69%
- Low=0%-49%.

For risk assessment, the cut off levels considered are as per the risk assessment regulation, 2019 of the Ministry of Public Service and Labour. Where:

- High=15-25
- Medium=5-14
- Low=1-4.

#### IV.3.6. Data collection and analysis

Data collection was performed by using checklists validated during the inception report validation meeting. For data quality control, the consultant carried out a refresher training session on principals, techniques and experiences on OSH risk and law compliance assessments among the team of assessors. In addition, there was an overall coordinator of the data collection exercise who ensured harmonization and data quality assurance.

Regarding data entry and analysis, they were performed by using excel.

#### IV.3.7. Ethical considerations

For ethical consideration purposes, the participation in the assessment was anonymous and voluntary; written informed consent to participate in the study was obtained from each participant. Institutions that refused to participate were replaced by the consenting ones. The following confidentiality principles were considered:

- No documents received or produced by the consultant will be copied for any purposes other than strictly necessary for the project
- The personnel of the consultant will not disclose any particular feature of the project to any third party

- No names of enterprises will be mentioned in the assessment results and reports.

#### **IV.3.8. Determining the level of risk and compliance**

At enterprise and economic activity level, the level of risk and compliance were determined by calculating:

- The total score of types of hazards or compliance to legal requirements assessed
- The total number of types of hazards or compliance to legal requirements assessed
- The average level of risk/compliance by dividing the total score by the number of elements assessed.

### **V. FINDINGS AND ANALYSIS**

#### **V.1. Introduction**

The OSH status for each economic activity was obtained through carrying out the risk and law compliance assessments for each economic activity.

In order to have the level of risk and level of compliance for each enterprise, an average was made by dividing the total score of items assessed by their number.

For each economic activity, the same principle was applied and an average was made by dividing the total score of items assessed by their number.

#### **V.2. Risk assessment**

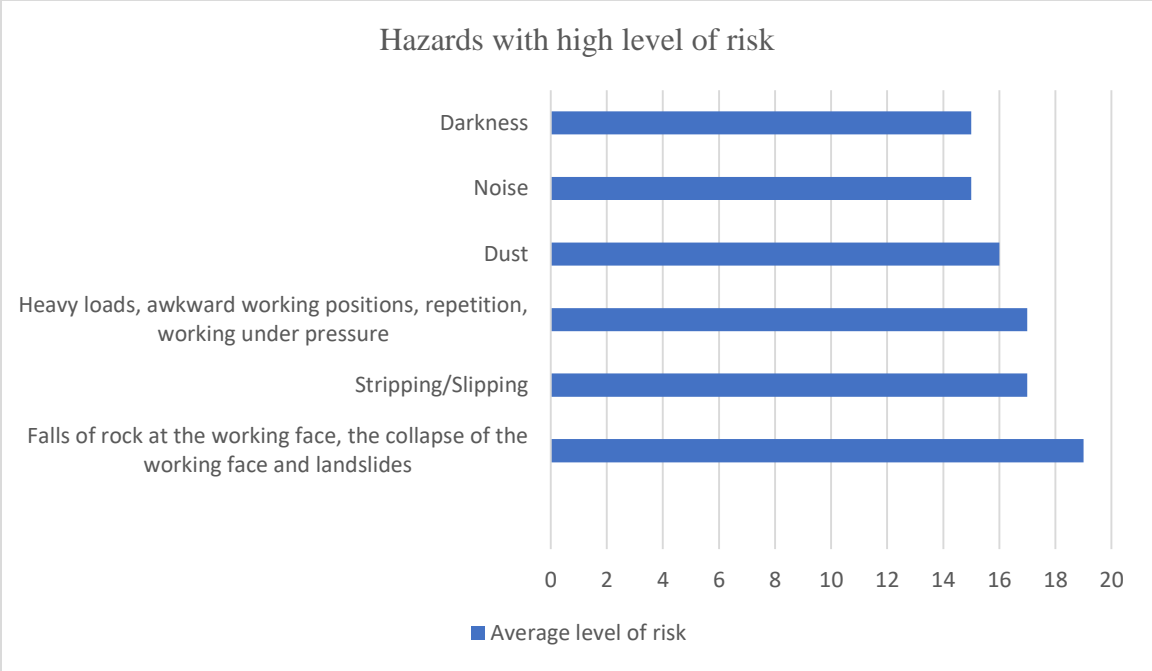
##### **V.2.1. Table and figures summarizing the risk assessment findings**

**Table 4: Average level of risk by type of hazard**

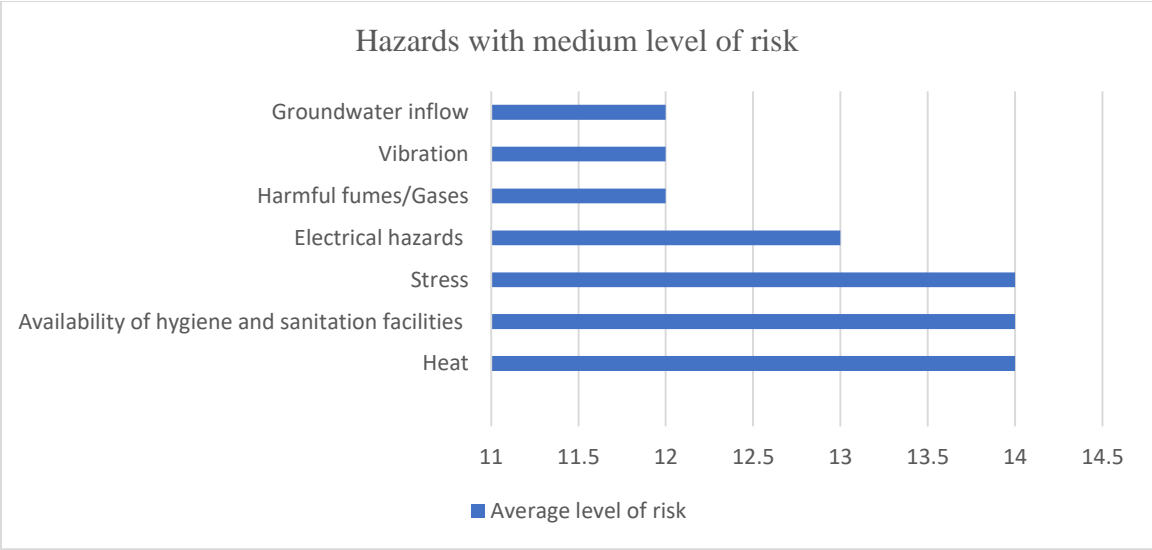


Type of hazard	Average level of risk	Degree of risk		
		High	Medium	Low
Falls of rock at the working face, the collapse of the working face and landslides	19			
Stripping/Slipping	17			
Heavy loads, awkward working positions, repetition, working under pressure	17			
Dust	16			
Noise	15			
Darkness	15			
Heat	14			
Availability of hygiene and sanitation facilities	14			
Stress	14			
Electrical hazards	13			
Harmful fumes/Gases	12			
Vibration	12			
Groundwater inflow	12			
<b>Total average level of risk</b>	<b>15</b>			

Figure 8: Types of hazards with high level of risk



**Figure 9: Types of hazards with medium level of risk**



**V.2.2. Economic activity risk status**

The table and figures above indicate that out of 13 types of hazards assessed, six (6) of them equivalent to 46% have high level of risk and seven (7) of them equivalent to 54% have medium level of risk. Overall, the economic activity has an average level of risk of 15 putting it in high-risk category.

**V.3. Compliance assessment**

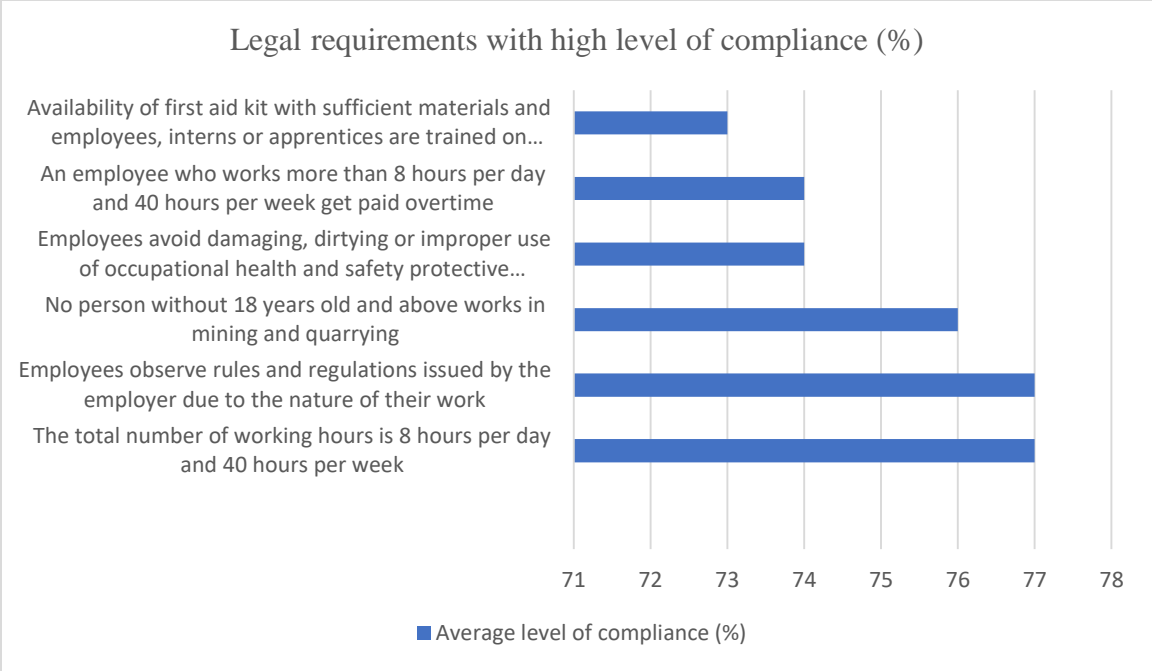
### V.3.1. Table and figures summarizing compliance assessment findings

**Table 5: Average level of compliance by legal requirement**

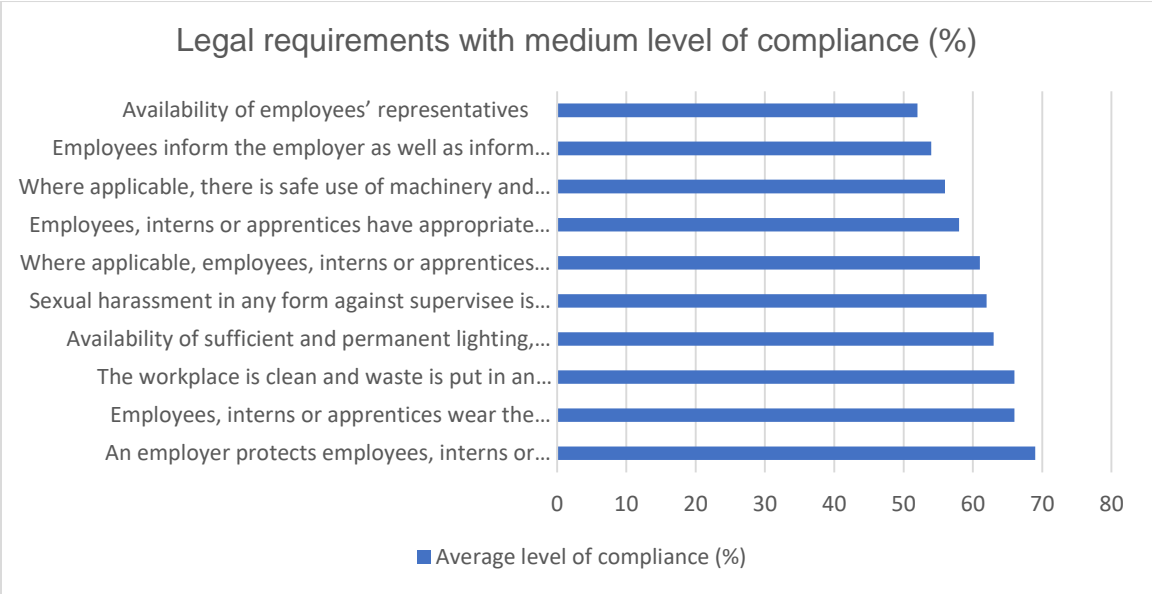
Legal requirement	Average level of compliance (%)	Degree of level of compliance		
		High	Medium	Low
The total number of working hours is 8 hours per day and 40 hours per week	77			
Employees observe rules and regulations issued by the employer due to the nature of their work	77			
No person without 18 years old and above works in mining and quarrying	76			
Employees avoid damaging, dirtying or improper use of occupational health and safety protective equipment availed to them	74			
An employee who works more than 8 hours per day and 40 hours per week get paid overtime	74			
Availability of first aid kit with sufficient materials and employees, interns or apprentices are trained on how to use them	73			
An employer protects employees, interns or apprentices from manually handling chemical products that may cause risk to them	69			
Employees, interns or apprentices wear the necessary occupational health and safety protective equipment and that equipment is used at appropriate time	66			
The workplace is clean and waste is put in an appropriate place	66			
Availability of sufficient and permanent lighting, prevention of noise or vibration, free and drinking clean water	63			
Sexual harassment in any form against supervisee is prohibited	62			
Where applicable, employees, interns or apprentices have clean dressing rooms separate for men and for women, a workplace and equipment that comply with ergonomic standards	61			
Employees, interns or apprentices have appropriate means for cleaning, easily accessible sanitary conveniences and separate for men and for women	58			
Where applicable, there is safe use of machinery and other equipment	56			
Employees inform the employer as well as inform and protect colleagues of occupational hazard, disease or any other event that may cause hazard at workplace	54			

Availability of employees' representatives	52			
A written document indicating protective mechanisms is prepared in a clear and understandable language for employees, interns and apprentices and displayed at appropriate places	44			
The availability of fire prevention and fire-fighting measures	40			
The salaries of all employees are paid through bank or in a financial institution recognized	38			
Occupational hazards, diseases and deaths are recorded and reported to labour inspector and RSSB	37			
Occupational safety and health committees exist, are trained, have a register for occupational injuries recording and are functional	36			
All employees who have exceed ninety (90) consecutive days in an enterprise have written employment contracts	34			
Enterprise has occupational safety and health policy	34			
Employees are affiliated and their contributions are paid to the social security organ in Rwanda	33			
Where applicable, an employer conducts occupational safety and health risk assessment at least once a year	32			
Workers undergo medical checkup at least once a year	29			
Employees are trained on occupational health and safety matters at work at least once a year	28			
An emergency plan is in place and regularly revised based on the potential risks at workplace	27			
A workplace has a passage for wheelchairs, guardrails and other devices that may serve as support passage for persons with disabilities	22			
A hoist or lift is of good mechanical construction and adequate strength and is maintained at least once in every six (6) months	22			
A workplace has washrooms separate for men and women	22			
<b>Total</b>	<b>49.54</b>			

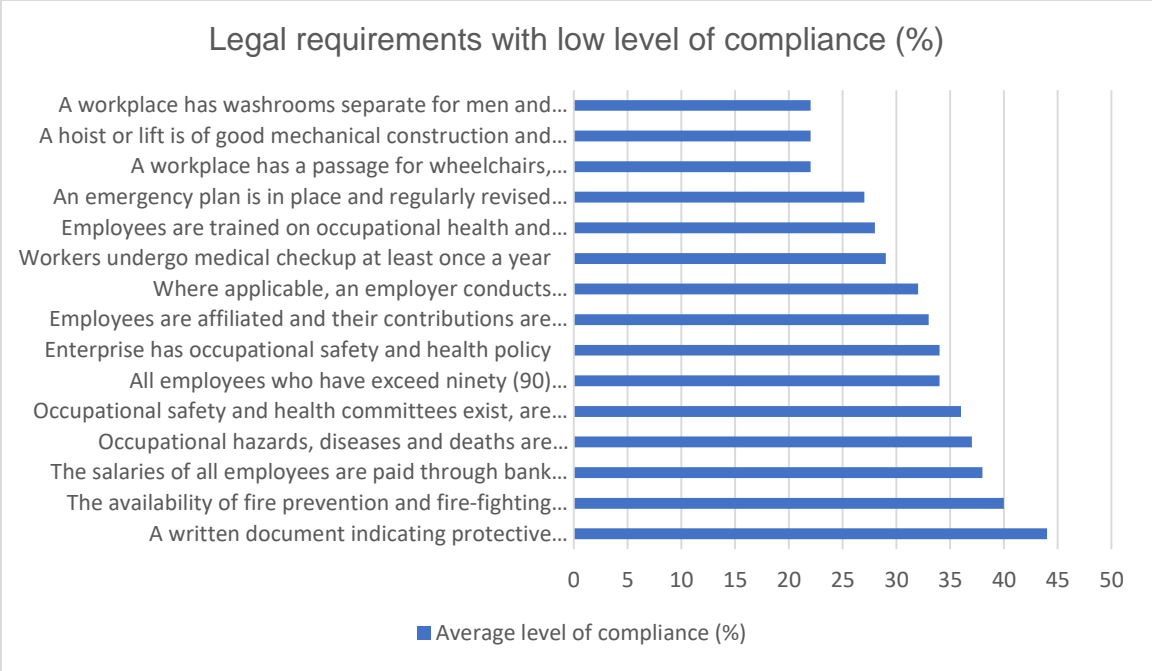
**Figure 10: Legal requirements with high level of compliance**



**Figure 11: Legal requirements with medium level of compliance**



**Figure 12: Legal requirements with low level of compliance**



**V.3.2. Economic activity compliance status**

The table and figures above indicate that out of thirty-one (31) legal requirements assessed, six (6) of them equivalent to 19% have high level compliance, ten (10) of them equivalent to 32% have medium level of compliance and majority (15) of them equivalent to 48% have low level of compliance. Overall, the economic activity has an average level of compliance of 49.54% putting it in low compliance category.

**VI. RECOMMENDATIONS**

## VI.1. Recommendations on enhancing law compliance

**Table 6: Recommendations on enhancing law compliance**

No	Recommendation	Responsible Institution
1.	Conduct periodic and regular awareness campaigns among employers and employees on OSH	<ul style="list-style-type: none"> <li>• Each employer</li> <li>• MIFOTRA</li> <li>• RMB</li> <li>• RMA</li> <li>• REWU</li> </ul>
2.	Conduct annual risk assessment to inform preventive actions	<ul style="list-style-type: none"> <li>• Each employer</li> <li>• MIFOTRA</li> </ul>
3.	Develop organizational OSH policy and its implementation plan	<ul style="list-style-type: none"> <li>• Each employer</li> <li>• MIFOTRA</li> <li>• RMB</li> <li>• RMA</li> <li>• REWU</li> </ul>
4.	Ensure law enforcement through inspections especially for legal requirements identified having Low and Medium level of compliance	<ul style="list-style-type: none"> <li>• Each employer</li> <li>• MIFOTRA</li> <li>• RMB</li> <li>• REWU</li> </ul>
5.	Conduct capacity building of OSH committees and enhance their functioning	<ul style="list-style-type: none"> <li>• Each employer</li> <li>• MIFOTRA</li> <li>• REWU</li> </ul>
6.	Award best practices to encourage improvement in OSH among enterprises	<ul style="list-style-type: none"> <li>• RSSB</li> <li>• MIFOTRA</li> <li>• RMB</li> </ul>
7.	Conducting periodic and regular National risk and compliance assessment to track the sectoral improvement progress	<ul style="list-style-type: none"> <li>• RSSB</li> <li>• MIFOTRA</li> <li>• RMB</li> </ul>

## VI.2. Recommendations to address identified hazards and related risks

### i) Dust

Airborne contaminants, such as rock dust, are mainly produced during drilling operations, mineral getting, loading, crushing of rock or ore, and blasting. Persons exposed to excessive dust for prolonged periods may suffer from permanent lung diseases, such as silicosis.

As far as practicable, the escape of dust into the atmosphere should be prevented, particularly in stagnant zones.

Dust should be controlled or suppressed by:

- Using wet drilling techniques.
- Using water sprays during mineral getting, loading, crushing.

In general, any stone surface being worked should be kept moist to reduce the escape of dust into the atmosphere.

Silicosis: lung fibrosis caused by the inhalation of dust containing silica possibly leading to lung cancer (IARC)

Where such dust control measures are not provided or have not been developed, mineworkers exposed to excessive dust concentrations in their working environment should always use personal protective equipment, such as dust masks to prevent dust from being inhaled.

## **ii) Noise**

Repeated or prolonged exposure to excessive noise levels will lead to hearing impairment.

Potential sources of noise emissions include compressors, drilling machines, pick-hammers or other mechanical equipment used at a mine.

Wherever possible, such noise sources should be muffled with an effective acoustic absorbing material so as to reduce noise emissions to tolerable levels. Increasing the distance between the noise source and the listener is often a practical method of noise control.

Where such noise control measures are not possible, comfortable and practical personal hearing protection devices, such as approved ear plugs or ear muffs, should be worn by every person exposed to noise levels exceeding 90 dbA.

Since the sound pressure of pick-hammers or drilling machines normally exceeds acceptable levels, every person working with or in the vicinity of such devices should always use ear protection.

## **iii) Heat stress**

Workers should be informed of the nature of heat stress and its adverse effects, as well as of protective measures. They should be taught that heat tolerance is very dependent on drinking enough water (not merely satisfying thirst) and eating a balanced diet.

Workers should also be taught the signs and symptoms of heat disorders (e.g. dizziness, faintness, breathlessness, palpitations, and extreme thirst).

Workers should have ready access to water or other appropriate drinks which encourage re-hydration. Carbonated drinks and drinks containing caffeine and heavy concentrations of sugar or salt should not be offered.

Modified work practices can reduce the likelihood of heat stress — e.g. by reducing individual workload through the provision of tools or task-sharing, or by scheduling appropriate breaks.

## **iv) Air quality control**



The employer should ensure that there is a dust, gas and dangerous elements control and ensure that enough ventilation system is put in place to prevent workers from breathing dangerous mining dust.

The purpose of ventilation in underground mining is to ensure that sufficient fresh air enters the underground environment to dilute, render harmless and remove any flammable or noxious gases and airborne dust. Fresh air should comply with RS 543.

### **Inadequate ergonomic conditions**

Many aspects of mining work carry risk of injury to the upper and lower limbs or spine, either because of the manual handling tasks involved or because of awkward postures.

Basic ergonomic requirements should be considered, including workplace layout, design of equipment and tools, working techniques, working time and rest patterns.

The main causes of injury are heavy loads, awkward working positions, repetition, working under pressure.

### **v) Geological failure/Fall of rocks**

The employer shall ensure a system to control any geological failure at the operation is in place. Key areas to consider when managing geological risks through hazard management plans include regular inspections of areas at risk of geological failure e.g. folds, faults, joints, dips, weathering and land slide. The greater the risk to the safety or health of persons at a place, the more frequent should be the inspections.

### **vi) Flooding and Water Management**

The employer should ensure that a system is in place to prevent the adverse effects of flooding or water breaches.

### **vii) Darkness**

The lighting provisions for all workplaces, travelling ways and fixed installations should be designed so that all activities can be carried out safely.

### **viii) Inadequate sanitation**

The employer should ensure good hygienic and sanitary conditions in mining areas for the protection of health of miners. Adequate toilet facilities should be provided in an accessible proximity to working places.

## VII. BIBLIOGRAPHY

Armstrong BK, Krickler A. The epidemiology of UV induced skin cancer. *J Photochem Photobiol B*. 2001; 63:8-18

Artisanal and small-scale mining in africa: a reality check by Kevin PCJ D'SOUZA-Principal Mining Engineer, Wardell Armstrong Consulting Group, UK

Bråtveit M, Moen BE, Mashalla JS, Maalim H. Dust exposure during small-scale mining in Tanzania: a pilot study. *Ann Occup Hyg*. 2003; 47:235-240

Brown T. Silica exposure, smoking, silicosis and lung cancer – complex interactions. *Occup Med (Lond)*. 2009; 59:89-95

Cherrie JW, Gorman M, Ng W, Searl A, Shafir A, van Tongeren M. Health, socio-economic and environmental aspects of possible amendments to the EU Directive on the protection of workers from risks related to exposure to carcinogens and mutagens at work: Respirable crystalline silica. UK Institute of Occupational Medicine (IOM) Research Project P937/8 May 2011 (PDF)

Donoghue AM. Occupational health hazards in mining: an overview. *Occup Med (Lond)*. 2004; 54:283-289

Fernández-Navarro P, García-Pérez J, Ramis R, Boldo E, LópezAbente, G. Proximity to mining industry and cancer mortality. *Sci Total Environ*. 2012; 435:66-73

Gibb H, O'Leary KG. Mercury exposure and health impacts among individuals in the artisanal and small-scale gold mining community: a comprehensive review. *Environ Health Perspect*. 2014; 122:667-672. Available at: <http://dx.doi.org/10.1289/ehp.1307864> (accessed 12 Dec 2016)

Gottesfeld P, Andrew D, Dalhoff J. Silica exposures in artisanal smallscale mining in Tanzania and implications for tuberculosis prevention. *J Occup Environ Hyg*. 2015; 12:647-653

Green A, Battistutta D, Hart V, Leslie D, Weedon D. Skin cancer in a subtropical Australian population: incidence and lack of association with occupation. *Am J Epidemiol*. 1996; 144:1034-1040

Guild R, Ehrlich RI, Johnston JR, Ross MH. SIMRAC Handbook of Occupational Health Practice in the South African Mining Industry. The Safety in Mines Research Advisory Committee (SIMRAC) 2001. (ISBN 1-919853-02-2)

Health and safety performance indicators. International Council on Mining and Metals (ICMM), January 2014. Available at: <http://www.icmm.com/website/publications/pdfs/6613.pdf> (accessed 12 Dec 2016)

Hendryx M, O'Donnell K, Horn K. Lung cancer mortality is elevated in coal-mining areas of Appalachia. *Lung Cancer*. 2008; 62:1-7

<https://rdb.rw/export/export/products-directory/mining-sector/>

International Agency for Research on Cancer (IARC). IARC Monographs on the evaluation of carcinogenic risks to humans. Volume 81. Man-made vitreous fibres. 2002, World Health Organization (WHO). Available at: <https://monographs.iarc.fr/ENG/Monographs/vol81/mono81.pdf> (accessed 12 Dec 2016)

Jennings N. Social and Labor Issues in Small Scale Mines. International Labour Organization (ILO). Report for discussion at the Tripartite Meeting on Social and Labor Issues in Small-Scale Mines. ILO, Geneva, 1999. (ISBN 92-2-111480-5)

Labour inspection report, 2022-2023

La Minería del Oro Artesanal y a Pequeña Escala en Ecuador: Trabajo, Ambiente y Salud. Harari B, Harari F, editors. Institute for the Development of Production and the Work Environment, Quito, Ecuador (IFA), University of Lund, Sweden, and PHIME Project. Editorial El Conejo. Ecuador; 2016. In print

Law N° 66/2018 of 30/08/2018 regulating labour in Rwanda

Mining. English Wikipedia. Available at: <https://en.wikipedia.org/wiki/Mining> (accessed 12 Dec 2016)

Ministerial Order N° 02/MIFOTRA/22 of 30/08/2022 on occupational safety, employees' and employers' organisations, child employment, employment of a foreigner, the child and circumstantial leave

National Institute for Occupational Safety and Health (NIOSH). Proposed National Strategies for the Prevention of Leading Work-Related Diseases and Injuries: Occupational Cancers. Cincinnati, OH: NIOSH, 1986. Available at: <https://www.cdc.gov/niosh/docs/89-130/> (accessed 10 May 2017)

Occupational Safety and Health Administration (OSHA). Rule: Occupational Exposure to Respirable Crystalline Silica, March 2016. Available at: <https://www.federalregister.gov/articles/2016/03/25/2016-04800/occupational-exposure-to-respirable-crystalline-silica> (accessed 12 Dec 2016)

Occupational safety and Health country profile of Rwanda, 2019

National risk assessment Regulations-Rwanda, 2019

Rwanda mines, petroleum and gas board report, 2017-2018

Rwanda social security board report, 2021-2022

Wang M, Song H, Chen WQ, Lu C, Hu Q, Ren Z, et al. Cancer mortality in a Chinese population surrounding a multi-metal sulphide mine in Guangdong province: an ecologic study. BMC Public Health. 2011; 11:319. Available at: <http://bmcpublihealth.biomedcentral.com/articles/10.1186/1471-2458-11-319> (accessed 12 Dec 2016)

Walle M, Jennings N. Safety and Health in Small-Scale Surface Mines: A Handbook. Sectoral Activities Programme Working Paper No. 168, International Labour Office (ILO), Geneva, 2001 (ISBN 92-2-112475-4). Available at: [http://www.ilo.org/wcmsp5/groups/public/@ed\\_dialogue/@sector/documents/publication/wcms\\_162738.pdf](http://www.ilo.org/wcmsp5/groups/public/@ed_dialogue/@sector/documents/publication/wcms_162738.pdf) (accessed 12 Dec 2016)

World Health Organization (WHO). Health risks of heavy metals from long-range transboundary air pollution; WHO: Copenhagen, Denmark, 2007. Available at: [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0007/78649/E91044.pdf](http://www.euro.who.int/__data/assets/pdf_file/0007/78649/E91044.pdf) (accessed 12 Dec 2016)

Vingård E, Elgstrand K. Safety and health in mining. In: Elgstrand K, Vingård E, editors. Occupational Safety and Health in Mining – Anthology on the situation in 16 mining countries. Arbete och Hälsa (Work and Health). 2013; 47(2):1-14. University of Gothenburg, Sweden (ISBN 978-91-85971-43-5)

Yu-Tang L, Zhen C. A retrospective lung cancer mortality study of people exposed to insoluble arsenic and radon. Lung Cancer. 1996; 14(Suppl 1):S137-S148.

[www.nai.diva-portal.org](http://www.nai.diva-portal.org),

Takala J, Saarela KL. Global estimates of occupational accidents. Saf Sci. 2006;44(2):137-156  
A systematic review of factors leading to occupational injuries and fatalities Dadoo, JE & Al-Samarraie, H available via <http://dx.doi.org/10.1007/s10389-020-01427-4>

Occupational health and safety in the African region: situation analysis and perspectives, AFR/RC54/13 Rev. 1 18 June 2004.