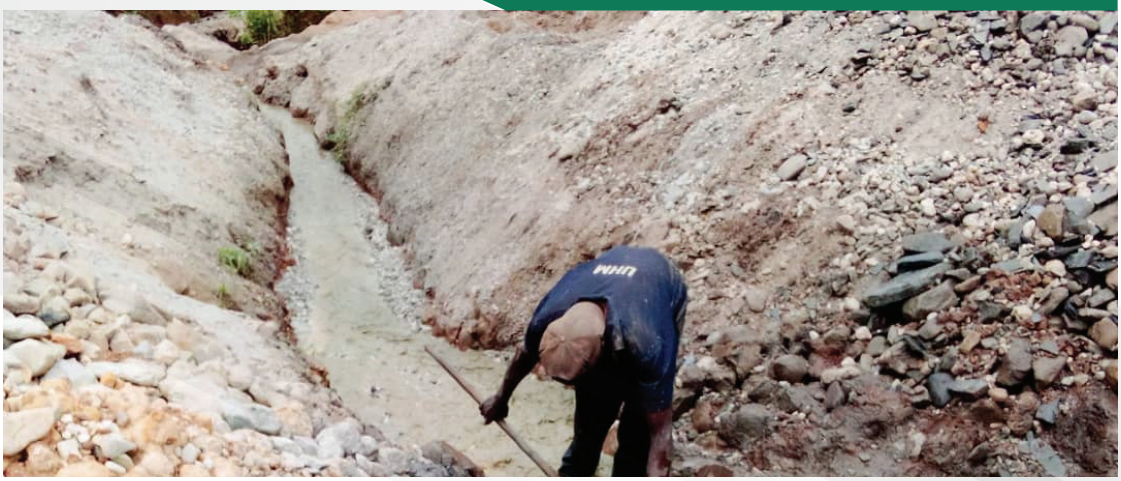


RWANDA NATIONAL ACTION PLAN FOR THE ARTISANAL AND SMALL SCALE GOLD MINING SECTOR



May 2023

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ABBREVIATIONS AND ACRONYMS

AMV	Africa Mining Vision
ASGM	Artisanal and Small-scale Gold Mining
ASM	Artisanal and Small-scale Mining
AU	African Union
CHW	Community Health Worker
COMIKAGI	Coopérative Minière of Kababaru-Gikingo (a mining cooperative)
CSO	Civil Society Organisation
EAC	East African Community
EIA	Environmental Impact Assessment
FGD	Focus Group Discussion
FONERWA	Fonds Nationale de l'Environnement du Rwanda
GEF	Global Environment Facility
Geo-IMS	Geomatics-Inventory Management System
GIZ	Gesellschaft für Internationale Zusammenarbeit (a development agency)
GMA	Global Mercury Project
HIV/AIDS	Human Immunodeficiency Virus Infection and Acquired Immune Deficiency Syndrome
Hg	Mercury
HLNSC	High Level National Steering Committee
HSSP4	Rwanda Fourth Health Sector Strategic Plan (2018-2024)
IPRC	Integrated Polytechnic Regional College
ITSCI	International Tin Supply Chain Initiative
ITRI	International Tin Research Institute
KII	Key Informant Interview
M&E	Monitoring and Evaluation
MIA	Minamata Initial Assessment
MIFOTRA	Ministry of Public Service and Labour
MIGEPROF	Ministry of Gender and Family Promotion
MINAGRI	Ministry of Agriculture and Animal Resource
MINALOC	Ministry of Local Government
MINECOFIN	Ministry of Finance and Economic Planning
MINEDUC	Ministry of Education
MINICOM	Ministry of Trade and Industry
MINICT	Ministry of Information Communication Technology and Innovation
MINIJUST	Ministry of Justice
MININFRA	Ministry of Infrastructure
MOA	Memorandum of Agreement
MoE	Ministry of Environment

MoH	Ministry of Health
MOU	Memorandum of Understanding
NAP	National Action Plan
NCDA	National Child Development Agency
NCPD	National Council of Persons with Disabilities
NIRDA	National Industrial Research and Development Agency
NISR	National Institute of Statistics of Rwanda
NLA	National Land Authority
NPPA	National Public Prosecution Authority
NSC	National Steering Committee
NST1	National Strategy for Transformation (2017-2024)
NWC	National Women Council
OSHS	Occupational Safety and Health Standards
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
RAB	Rwanda Agricultural Board
RBA	Rwanda Broadcasting Agency
RBC	Rwanda Biomedical Center
REMA	Rwanda Environmental Management Authority
RFA	Rwanda Forestry Authority
GGR	Gasabo Gold Refinery
RIB	Rwanda Investigation Bureau
RMA	Rwanda Mining Association
RMB	Rwanda Mines, Petroleum and Gas Board
RoR	Republic of Rwanda
RPN	Rwanda National Police
RRA	Rwanda Revenue Authority
RSB	Rwanda Standards Board
RTB	Rwanda Technical and Vocational Education and Training (TVET) Board
RURA	Rwanda Utilities Regulatory Authority
RWB	Rwanda Water Resources Board
SOPs	Standard Operating Procedures
TB	Tuberculosis
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
UR	University of Rwanda
USGS	United States Geological Society
WBG	World Bank Group
WHO	World Health Organization

FOREWORD

Artisanal and Small-scale Gold Mining (ASGM) is recognised in most sub-Saharan African countries as the main source of direct human exposure to the highly volatile elemental mercury that is also known for its long-range transport potential, making it a toxic chemical of global significance. The Government of the Republic of Rwanda recognises the socio-economic benefits from the country's ASGM sector and has over the past decades been promoting the formalisation of the sector in order to foster environmental accountability.

The country acceded to the Minamata Convention on Mercury on 29th June 2017 and has been making efforts to domesticate its provisions in order to protect its population and neighbourhood from the adverse effects of mercury. The development of the National Action Plan (NAP) for the ASGM sector is part of the Government effort to provide a road map for protecting people and the environment from the adverse effects of mercury. The NAP was also developed to in recognition of the severity of mercury use the ASGM sectors within the territories of surrounding countries, notably Uganda, Tanzania and Burundi.

The NAP development process started in March 2022, and was done concurrently with the economy-wide Minamata Initial Assessment (MIA). The baseline data and information on the ASGM sector in Rwanda was gathered by consultants working with Rwanda Environment Management Authority (REMA) under the Ministry of Environment. The NAP was then developed as informed by the baseline data and additional stakeholder consultations. The NAP report reflects the interests, concerns and preferences of all key stakeholders on mercury management in Rwanda.

The main chapters of the NAP were discussed at workshops and working meetings during the period from March-August 2022 with participation of representatives from Government Ministries, Departments and Agencies, international organizations, civil society and the public at large. The consultant and experts in the National Steering Committee participated in the preparation of this document.

The Ministry of Environment, through REMA, expresses its gratitude to the Global Environment Facility (GEF), UNIDO, and UNITAR, for financing, coordinating and supporting the development process of the NAP report. On behalf of REMA, I also wish to thank all the stakeholders who participated in

the production of the NAP report, either through participating on the National Steering Committee, or carrying out various activities related to the NAP development process, or participating in NAP-related workshops and engagements.

I look forward to the continued cooperation in implementing the NAP recommendations.

Sincerely,

Juliet KABERA

Director General, REMA

ACKNOWLEDGEMENTS

The Rwanda Environment Management Authority (REMA), on behalf of the Government of the Republic of Rwanda, wishes to acknowledge with sincere gratitude the contribution of everyone who participated in the development of the Rwanda National Action Plan (NAP) for the Artisanal and Smallscale Gold Mining (ASGM) Sector.

The NAP was developed with financial support from the Global Environmental Facility (GEF) channelled through United Nations Industrial Development Organisation (UNIDO) as the implementing agency. The NAP development process benefitted immensely from technical support provided by experts from the United Nations Institute for Training and Research (UNITAR) and UNIDO.

The NAP was adequately informed by a combination of field surveys and related stakeholder consultations under the facilitation of a multi-disciplinary team of experts, officials from Government ministries, departments and agencies, and private entities. The assignment cannot be successful without the observed dedication of the ASGM players and their communities who provided input into this work.

Special thanks are extended to the following experts for their contribution to the NAP development:

1. National Consultant, Effective Logistics and Consultancy Group (ELCG) Pvt Ltd and its dedicated team of experts.

2. National Steering Committee members, drawn from both the government and the private sector.

3. UNITAR and UNIDO technical experts and international reviewers.

4. REMA officials involved in the assignment.

KEY GLOSSARY OF TERMS

Illegal miners: Individuals who extract minerals without an operating license or permit (taken as thieves of minerals in Rwandan context).

Artisanal gold mining: Gold extraction and/or processing conducted by individual miners or small enterprises using manual or semi-mechanised processes with limited capital investment and generally achieving relatively low gold production. In Rwanda this category of mining exists but is not legally defined under the Regulations of the Chief Executive Officer (N° 005/MINES/RMB/2019) determining potential mining areas, criteria for categorisation of mines, modalities and requirements for mineral licence application and for tenders. Despite this lack of definition, an artisanal gold miner in Rwanda could be a miner forming part of a registered cooperative with a permit to extract gold under small- or medium scale mining. Without such permit the miner is considered illegal.

Large scale gold mining: Gold extraction and/or processing conducted by large enterprises: (1) on a mining block exceeding hundred hectares (100 ha) but not exceeding four hundred hectares (400 ha); (2) with a licence of a maximum term of fifteen (15) years renewable; (3) using appropriate modern and efficient equipment and technologies in mining operations, mineral processing, metallurgy and environmental management; (4) having high degree of mineral processing up to export grades as may be stipulated by the Chief Executive Officer; and (5) employing qualified mining staff, including a mine manager, professionals in charge of mining engineering, mineral processing, environmental management, health and safety and community relations.

Medium scale gold mining: Gold extraction and/or processing conducted by medium enterprises: (1) on a mining block of more than fifty hectares (50 ha) but not exceeding hundred hectares (100 ha); (2) with a mineral license of a term of ten (10) years renewable; (3) using appropriate modern and efficient equipment and technologies in mining operations, mineral processing, metallurgy, and environmental management, (4) having high degree of mineral processing up to export grades as may be stipulated by the Chief Executive Officer; (5) employing qualified staff; and (6) having at least forty per cent (40%) of local shareholders.

Small scale gold mining: Gold extraction and/or processing conducted by small enterprises: (1) on a mining block of up to fifty hectares (50 ha); (2) with a mineral licence of five (5) years renewable; (3) using appropriate modern and efficient mining equipment; (4) employing qualified mining professionals; and (5) having 100 local ownership.

Miner: A general term referring to a person directly involved in extraction of a mineral, and excludes those who process the ore. Most of the miners are providers of manual labour, while some are license holders.

EXECUTIVE SUMMARY

The Republic of Rwanda has developed the National Action Plan (NAP) as part of the Government efforts to improve the understanding on the scope of mercury use and prevention measures in the Artisanal and Small-scale Gold Mining (ASGM) sector. While the ASGM sector has been responsible for most mercury emissions worldwide, there has been limited data and information on the status of this sector in Rwanda. The NAP was therefore developed to inform on the country's technical, financial and human capacity needs to manage mercury in this sector in compliance with the Minamata Convention, with the Government having indicated that artisanal and small-scale gold mining and processing in its territory is more than insignificant.

Rwanda ASGM and the NAP Process

Historically, artisanal gold mining in Rwanda dates back to the early 1930s. However there has been some significant shift from artisanal to small-scale and large-scale mining. Due to the unavailability of quantitative information on mercury use in Rwanda's ASGM sector, global estimates of the country's contribution to the mercury releases and emissions (averaging 300 kg/year) have had a very high margin of error (±100%) (UN Environment, 2017)[1].

To address the high uncertainties in mercury use in Rwanda's ASGM sector, and also as part of the country's obligations to the Minamata Convention, a national comprehensive analysis of the ASGM sector, including both field survey and desk research, was conducted. The analysis covered: (1) previous experiences in addressing ASGM, (2) geographical distribution of ASGM, (3) mining and processing information, (4) baseline estimates of the amount of mercury used in ASGM, (5) legal and regulatory status, (6) leadership and organization of ASGM at national and local levels, (7) mercury trade and demand, (8) gold trade and supply chain, (9) demographic, social and economic aspects, (10) environmental information, and (11) health information, in accordance with the UNEP guidelines, and with technical support from the United Nations Institute for Training and Research (UNITAR) and United Nations Industrial Development Organisation (UNIDO).

1 UN Environment (2017) Global mercury supply, trade and demand. United Nations Environment Programme, Chemicalsand Health Branch, Geneva, Switzerland

The NAP was developed based on the findings from the baseline study and subsequent consultations with relevant stakeholders. An implementation plan and priorities for action, together with associated budget, were prepared. After the completion of the draft NAP report, validation workshops were conducted with relevant stakeholders to refine the report before submission.

National Overview of ASGM Sector

ASGM sites and mining processes

The management and operations of ASGM sites are organised as either companies or cooperatives. Artisanal mining sites are mainly registered cooperatives with permits to extract gold under small- or medium scale mining. Weather hired- or self-labour, a cooperative member is a shareholder with rights to the profits made by the cooperative. Companies however, are owned by an individual or small group of people with a workforce on salaries but usually not entitled to any shares of the company. The reported arrests of individual illegal gold miners suggest rare informal gold mining; however, the study did not find evidence to suggest that this is rampant in Rwanda. These miners would know that they are at risk of being arrested and as such could not be identified to share information on the possible use of mercury and gold trade in illegal operations.

The outcomes of the field survey and stakeholder consultations revealed that, there are currently 21 sites where gold is being mined and 13 sites with gold deposits that are under exploration. Among those active concessions, only two were extracting alluvial gold while others were mining gold from hard rock. The sites with hard rock extraction were preliminarily identified as sites with likelihood of mercury use in gold processing. Traditionally, alluvial gold extraction obtains gold nuggets of relatively high purity and therefore do not use mercury. With the exception of alluvial gold mining that occurs at the surface, the mining process begins with manual excavation of shafts to depths of approximately 6–10 metres at which ore bearing veins are encountered. Once ore is found, it is extracted by teams of about five to eight (men; as per observations) by digging of horizontal or semi horizontal tunnels that follow hard or weathered veins. The host rocks are broken down into gravel-size (about 4-70 mm) pebbles using hand tools that include pickaxes, spades and jackhammers.

The ore is then hauled to the surface in sacks using vertical conveyers. From the surface, the ore, including low-grade material and waste rock are manually carried to the processing areas. At the processing units, the material is milled to reduce the grain sizes to sand-size (not more than 2 mm). Most of the companies and cooperatives have established water retention ponds that supply water continuously to sluices, manually conducted into trenches. Heavy minerals at the bottom of the trench are collected and then panned to recover gold preconcentrate. The pre-concentrate is then transported to the company/ cooperative office where further purification with magnet is conducted.

At other processing plants, the ore is manually screened to stone size, and larger rocks broken down using hammers. After the grain size control, the ore is subjected to wet grinding using a milling machine with balls (ball-mill). The milled ore is then concentrated through a zig-zag sluice achieved by creating a drop between the first and second platform that disrupts the velocity of the water as it travels down the sluices which are covered by the carpets. Carpets are then removed and washed in a bucket to remove the captured dense material including gold. Those dense materials are then subjected consecutively to panning and to the drying process before being finally purified using a magnet to remove magnetic minerals such as magnetite from concentrate.

From the 13 visited ASGM sites no mercury use was reported by the miners nor encountered during the field survey on gold processing. The field observations revealed that the final product produced by the miners was in the form of gold rich sands, and there was noevidence of spongy gold that is normally associated with mercury use. The findings were confirmed during consultations with officials from the Rwanda Mines, Petroleum and Gas Board (RMB) and the Rwanda Environment Management Authority (REMA).

Gold refining (which includes both smelting and purification), trade and export are regulated and require licenses which are issued by RMB as the responsible regulatory authority, a requirement of the Mining Law. In the previous years before 2020, gold refinement and trade in gold was restricted to dealers approved by the RMB, and who are required produce an import or export declaration. With effect from 1 July 2020 the RMB started issuing the Rwanda Mineral Export Certificate to fight against illegal exploitation of gold and ensure proper reporting, demand due diligence, and transparency. This saw the emergence of the Gasabo Gold Refinery (GGR) as the sole buyer and refiner of gold from the mentioned concessions. After refining to 99.99% purity, GGR pays the mining companies based on mass of the purified gold and the current price according

to the London Fix price. Apart from the mined gold, GGR also buys unrefined gold from some countries and then exports it after refining, largely to support many African countries with no gold refinery.

Table ES 0.1 shows the country's annual domestic gold production between 2014 to 2020. Gold production has been increasing considerably between 2018 and 2020 largely because of government support, formalization of the sector in recent years and the establishment of GGR. The contribution of the ASGM sector to annual gold production relative to the large-scale gold mining sector could not be determined from the currently available data and information.

Table ES 0.1 *Annual national gold production*

Commodity (data source)	Annual production (kg)						
	2014	2015	2016	2017	2018	2019	2020
Gold (NISR, USGS)	160	319	336	300	300	5,898	11,532

In addition to the Rwanda Export Certificate the RMB also uses the International Conference on the Great Lakes Region (ICGLR) Mineral Exports Certification System governed by the Regional Certification Mechanism (RCM). This system was designed to prevent illegal trade in minerals markets.

ASGM and livelihood improvement

The gold mining sector plays a key role in the economy of the country but particularly to the livelihoods for miners. In fact, it enables them to feed their families and to pay school fees for their children, medical health insurance, clothes for their families and participate in money saving cooperatives, construction of houses for the family, initiate small businesses for their spouses, among others. Besides this, the sector injects cash into the local economy and creates a market for agricultural outputs (given the rural nature of the mining) and other goods and services, thereby catalysing local development.

Despite the non-use of mercury in gold processing in Rwandan ASGM, there is no regulation prohibiting the import or use of mercury as elemental mercury, which is a legal gap in mercury use. The country concerted to no import of mercury compounds, including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds under the Rotterdam Conversion in 2004. However, for elementary mercury the country is yet to adequately domesticate the Minamata Convention in its national laws.

Other identified gaps include: (1) Low awareness of mercury related problem by different actors involved in mining sector, low knowledge of high gold recovery techniques free of mercury; (2) lack of harmonization of mercury trade within the region; (3) weak implementation of environment rehabilitation despite the payment of environment guaranty by mining company, (4) mining health related diseases reported by both local leaders healthcare professionals and miners; (5) low access to finance, materials and equipment by mining companies; (6) lack of accurate exploration data that result in resources loss by miners as they sometimes do exploration themselves; (7) unsafe and unsustainable mining practices that led to the environmental damages or fatal accident, for example, only one entry on the tunnel, low or non-ventilation in the tunnel, dry milling which generate dusts, non-use of Personal Protective Equipment (PPE), water pollution by sediments from mining, biodiversity loss due to land clearing and other practices, and inadequate knowledge in catchment management practices by miners.

National Action Plan to Prevent Use of Mercury in ASGM

The gaps identified during the baseline assessment and stakeholder consultations will be addressed by implementing the following national strategies:

1. Prevention of worst practices: The strategy promotes the adoption of technologies with higher gold recovery and without the use of mercury or any other harmful chemicals by miners. This encompasses raising awareness of the negative effects of mercury use as well as the good mining practices that ensures the safety of the miners. Documenting of the non-use of mercury and other chemicals in the mining laws, regulation and policy is also included in this strategy.

2. Facilitation of formalization or regularization of the ASGM sector: The strategy addresses some missing elements in the ongoing formalization process of ASGM through the elaboration of an achievable vision for ASGM transformation to medium scale. The elements to be overcome include limited access to financial and credits by miners, and the absence of accurate data and information on gold reserves in the country.

3. Manage trade and prevent diversion of mercury and mercury compounds: Rwanda does not currently have ASGM activities involving mercury and therefore the NAP proposes to take a precautionary approach. Linkages

between national and international regulatory authorities to curb smuggling of mercury will be developed to maintain Rwanda's successful import control measures at the ports of entry.

4. Involve stakeholders in the implementation and continuing development of the NAP mainly through: (1) increasing capacities and engagement of stakeholders (governmental and private) of ASGM in NAP implementation according to their human, technological and financial capacities, (2) Establish and maintain a communication platform among all stakeholders, (3) designing a plan for NAP progress monitoring and for consultation meetings in or nearby communities affected by mining and processing.

5. Maintain the current low levels of exposure of artisanal and small-scale gold miners and their communities to mercury: the strategy proposes to consider a precautionary approach to ensure a sustainable and mercury free gold mining ASGM sector and to undertake environmental research that could investigate the impacts of heavy metals load in water resources of ASGM area. Therefore the NAP proposes to assess the level mercury and heavy metals exposure of the ASGM community (1) strengthening enforcement and monitoring mechanisms on environmental rehabilitation and regular inspection

6. Prevent the exposure of vulnerable populations, particularly children and women of child-bearing age, to mercury used in ASGM: Rwanda does not currently have indications of mercury exposure of children and women of child-bearing age and therefore the NAP proposes to take a precautionary approach.

7. Provide information to artisanal and small-scale miners and affected communities: The strategy proposes to establish operational networks of stakeholders to support environmentally friendly and sustainable ASGM. Participatory approaches will be used to engage miners in awareness raising, including use of sign methods that will embed knowledge and transfer to local leaders for future knowledge transfer and sustainability.

8. Include market-based mechanisms to promote mercury free technologies: The strategy proposes to lobby for import tax exemption for mercury-free technologies.

9. Public health strategy: Addresses issues related to the health problems and Occupational Safety and Health Standards (OSHS) in the ASGM sector. It proposes to establish some Standard Operating Procedures (SOPs) for mining health related problem diagnostic and management, and train health care professionals in the mining sector for its application, and to update the existing OSH.

Furthermore, the evaluation of activities will be carried out using basic benchmarks and targets as outlined in the plan and the criteria and indicators as agreed upon by the stakeholders.

Implementation Plan

Evaluation will employ a combination of any of the following: (a) formal and informal surveys, (b) semi-structured interviews, (c) key informant interviews, (d) focus group discussions, (e) community meetings, (f) case studies, (g) participatory rural appraisal, (h) direct observation, (i) analysis of written documents, and (j) review of implementation methods.

1. INTRODUCTION

1.1. A brief country description

Rwanda is located in east-central Africa and found in the Great Lakes region of Africa, properly in the transition zone between East and Central Africa. It extends from 01˚02˚51˚ to 02˚50˚24˚ south, and lies between 28˚51˚42˚ and 30˚53˚57˚ east, covering a total area of 26,338 km^2. The country is landlocked and bordered by Uganda to the North, Tanzania to the East, Burundi to the South and the Democratic Republic of Congo to the West (Figure 1.1). Kigali is the capital city surrounded by four Administrative Provinces (Eastern, Western, Northern and Southern Provinces). The country is subdivided into 30 Districts, with the number of Districts per province ranging from 3 (City of Kigali) to 8 (Southern Province). Each District is divided into Sectors, Cells and Villages (RoR, 2021)[2].



Figure 1.1 Regional map of East African Community, **Source: UN (2012)**[3]

2 RoR (2021) Republic of Rwanda administrative structure. Republic of Rwanda (RoR), Kigali. https://www.gov.rw/government/administrative-structure (accessed: 04/04/2022)

3 UN (2012) Map No. 4248 Rev. 1. United Nations (UN) Department of Field Support, Cartographic Section, Geneva

After the genocide against Tutsis (1994) the country's leaders did their best for national socio cultural, economic and political reconstruction. Currently Rwanda's economic base is mainly small-scale and subsistence agriculture. The mining sector is part of national economy and plays a crucial role especially in Rwanda post genocide reconstruction. The country is now aspiring to middle income country status by 2035 and high income country status by 2050 (GoR, 2017)[4]. That milestone will be achieved through a series of seven years National Strategies for Transformation (NST1). This Strategy later came after the previous five-years Economic Development and Poverty Reduction Strategy (EDPRS-2) (2013-2018) and the EDPRS-1 (2008-2012). During the period between 2008 and2018, Rwanda's socio-economic performance grew by an average of 7.2% per annum, while per capita gross domestic product (GDP) grewby 5% per annum (World Bank, 2022)[5].

The covid 19 pandemic and its consequences reduced economic activities abruptly and caused GDP to collapse from 5% in 2019 to 3.4% in 2020. Currently, Rwanda is experiencing a substantial fiscal deficit resulting from the high dependence on large public investment which depends in large measure to the GDP (12.3% of GDP)6. The covid 19 pandemic generated an increase in borrowing needs and consequently the debit-to-GDP ratio rose from 19.4% in 2010 to 56.7% in 2019 and reached to 71.3% of GDP in 2020. The private sector is expected to play a big role in helping, to ensure economic growth however it is still facing a gap associated to low domestic savings, skills and high cost of energy. As far as the social context is concerned, the above-mentioned economic growth over the decade between 2008 and 2019 was accompanied by considerable improvement in living standards, with a two third drop in child mortality and near universal primary school enrolment. In addition, home grown policies and initiatives have contributed to significant improvement in access to services and human development indicators. Life expectancy at birth improved from 29 in the mid-1990 to 69 in 2009. Poverty line collapsed from 77% in 2001 to 55% in 2017. The maternal mortality ratio has fallen from 1270 per 100,000 live births in the 1990 to 290 in 2019. The Gini index that measures the official inequality declined from 0.52 in 2006 to 0.43 in 20177.

4 GoR (2017) 7 Years Government Programme: National Strategy for Transformation (NST1) 2017–2024. Government of Rwanda (GoR), Kigali. https://www.nirda.gov.rw/uploads/tx_dce/National_Strategy_For_Trsansformation_-NST1-min.pdf (accessed: 04/04/2022)

5 World Bank (2022) *Rwanda Overview: Development news, research, data*, available on https://www.worldbank.org retrieved on August 2nd , 2022.

6 Ibidem.

7 Ibidem

1.2. Mining industry

Mining exploitation in Rwanda started in 1930 with two main companies: Rwanda Urundi Tin Mines Company and Muhinga (MINETAIN: Société des Mines d'Etain du Rwanda-Urundi) and Kigali Mining Company. (SOMUKI: Société des Mines de Muhinga et de Kigali has been created in 1934 and followed by GEORWANDA and COREM in 1945 and 1948 respectively. After independence (July 1962), the Government of Rwanda merged all mining companies into a public mining company in an attempt to strengthen the industry. Hence SOMIRWA (Societé Miniére du Rwanda) was adopted on one side by the Government represented by the Minister of Finances and on the other side SOMUKI and MINETAIN. From 1962 the mining sector has undergone wide reforms that culminated in the privatization of government owned mines. Currently the mining sector is second-largest export revenue earned in the country.

Rwanda's mining sector is made up of artisanal, small-scale operations and larger scale operations, with varying degrees of mechanization and professionalization. The mechanization processes include the use of grinding machines for particle size reduction, shaking tables for gravimetric separation, magnetic field to remove magnetite and any other impurities remaining in the concentrate (Kabatesi et al., 2022)[8] There are deposits of gold and other mineral, but the main minerals extracted tin, tungsten, and tantalum, known as "the 3Ts". These mines are distributed throughout Rwanda's hilly terrain which presents unique challenges in extraction, processing and the disposal of tailings (DELVE, 2020)[9].

Over time, measures have been taken to make the mining sector more sustainable and more productive. Therefore, the vast majority, if not all, mines in Rwanda are licensed and formalized, and many are organized into cooperative structures (IGFM, 2017)[10]. This provides miners with more legitimacy and greater access to support services.

8 Kabatesi, J.C., Uwizeyimana, J., Rwabuhungu Rwatangabo, D.E. and Wang, J.P (2022) Evaluation of Efficiency of Using Mechanized Processing Techniques to Recover Tin and Tantalum in Gatsibo, Eastern Province, Rwanda. Minerals, 12, 315. https://doi.org/10.3390/min12030315

9 DELVE (2020) 2020 Stete of the ASM Sector Report, https://delvedatabase.org/data/countries/Rwanda

10 IGFM (2017), Mineral and Sustainable Development, IGF Mining Policy Framework Assessment: Rwanda, Intergovernmental Forum on Mining (IGFM) Winnipeg: IISD.

The history of gold mining dates back to as early as 1930 when Rwanda was still a colony of Belgium. The gold mining practices between 1930 and 1961 were entirely artisanal. The Government of Rwanda through NGALI Mining Ltd took a decision to start a small-scale mining business for improving the existent form of mining and achieving on a semi-industrial level (NML, 2022)[11]. With those efforts, the quantity of annual gold production has increased from 300 kg in 2015 to 5,898 and 11,532 kg in 2019 and 2020 respectively (NIRS, 2021)[12].

Currently, Rwanda is home of refineries of gold and tin, both of which have the capacity to process large amounts of minerals from within the country and the region (RMB, 2019)[13]. In addition, 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 (RDB, 2022)[14].

Although gold mining and processing plays a key role in countries economy and development, its numerous contribution towards mercury emissions and other environmental and social concerns remain a global challenge which led the gold mining sector to be considered by the international convention on mercury known as the Minamata Convention on Mercury. This convention was established in 2013 and entered into force in 2017 and ratified by Rwanda in June the same year.

The Article 7 and Annex C of the convention cover the artisanal and small-scale gold mining and processing in which mercury amalgamation is used to extract gold from ore and precise the obligation of each state member.

11 NML (2022) Mining. Ngali Mining Limited (NML), Kigali https://ngali.com/service/pearl-mining/

12 NISR (2021) Rwanda Statistical Yearbook 2021, December 2021. National Institute of Statistics of Rwanda (NISR), Kigali, 173 pp. https://www.statistics.gov.rw/publication/statistical-yearbook-2020

13 RMB (2022) Inside Rwanda's new investments in minerals. Rwanda Mines, Petroleum and Gas Board (RMB), Kigali ttps://www.rmb.gov.rw/index.php?id=100&tx_news_pi1%5Bnews%5D=51&tx_news_pi1%5Bday%5D=24&tx_news_pi1%5Bmonth%5D=6&tx_news_pi1%5Byear%5D=2019&cHash=1b5f388bef517e1db611d80b7c25ac15

14 RDB (2022) Export product directory: Mining sector. Rwanda Development Board (RDB), Kigali, https://rdb.rw/export/export/products-directory/mining-sector/

To comply with the Minamata convention especially in its Article 7, a number of efforts have been made by Rwanda. Those include but not limited to the survey of National Survey of Mercury and Mercury Compounds used in mining with particularly attention on ASGM and other Sectors of development conducted by REMA. This survey found several mercury users (e.g. dental and electronic waste managers,) with inefficient capacities to safely handle and dispose of mercury and mercury containing products as required by the Convention (REMA, 2018)[15].

As the first step towards the establishment of National Action Plan of artisanal and small-scale Gold Mining, a national overview was conducted. This process of the development of the NAP was initiated to improve the understanding on the scope of mercury use and prevention measures in the Artisanal and Small-scale Gold Mining (ASGM) sector. The NAP was also developed to strengthen national capacity to manage mercury in the sector in compliance with the Minamata Convention. The main aim of the NAP was to come up with strategies to reduce and, where feasible, eliminate the use of mercury in the ASGM sector.

1.3. Purpose and process of the NAP

The development of the NAP was initiated to improve the understanding on the scope of mercury use and prevention measures in the Artisanal and Small-scale Gold Mining (ASGM) sector. The NAP was also developed to strengthen national capacity to manage mercury in the sector in compliance with the Minamata Convention. The main aim of the NAP was to come up with strategies to reduce and, where feasible, eliminate the use of mercury in the ASGM sector.

The objectives of the assignment were to:

- Provide a national overview of the global Artisanal and Small-Scale Gold Mining (ASGM) sector, including a description of mercury use in ASGM.
- Quantify baseline estimates of the quantities of mercury used and the practices employed in ASGM and processing.
- Assess and document steps to facilitate the formalization or regulation of the ASGM sector.

15 REMA (2018) The national survey of mercury and mercury compounds used in mining with particular attention on Artisanal Small Scale Gold Mining (ASGM) and other sectors of development (health, ICT, industry, water, construction etc.), Rwanda Environment Management Authority (REMA), Kigali

- Draft and finalize National Action Plan (NAP), basing on the information and findings from other assignments that include the Minamata Initial Assessment (MIA).

The NAP development process followed a series of activities that can be summarized as four Components (Table 1.1).

Table 1.1 *The NAP components, processes and outputs*

Component	Output/Deliverable
1. Regional information exchange, capacity building and knowledge generation	• Implementing agency capacitated on the NAP process
2. Establishment of coordination mechanism and organization of process	• National Steering Committee coordinating the NAP project • Inception report
3. Develop a national overview of the ASGM sector, including baseline estimates of mercury use and practices	• Raw data set available • Draft report of the ASGM • Final ASGM study report
4. Develop, endorse, submit NAP on ASGM to Minamata Convention Secretariat	• Draft NAP report • Final NAP report

A National Steering Committee (NSC) was put in place to coordinate the development of the NAP. This Committee also coordinated the concurrent development of the Minamata Initial Assessment (MIA) that looked at the status of mercury issues in all relevant sectors of the economy. The terms of reference for the NSC were mainly focused on overseeing the development of the NAP, as well as the MIA. An inception workshop was conducted on the 29th April 2022 in Kigali. The workshop crafted an agreed work plan and assigned tasks and responsibilities to the National Consultant and NSC members for execution.

The National Consultant was oriented on the use of the methods of estimating mercury use and documenting practices in ASGM as well as compiling the National Overview of the ASGM and the NAP by technical experts from the United Nations Institute for Training and Research (UNITAR) and United Nations Industrial Development Organisation (UNIDO). This was the Artisanal Gold Council (AGC) toolkit produced in collaboration with the UNEP. The technical experts were also available for technical backstopping throughout the NAP development process. While the general approach to assessing the

countries ASGM sector was conducted, the detailed baseline assessment was not required as no mercury is used. Existing gold production data was used for national gold production information.

A national comprehensive analysis of ASGM sector was completed to support the development and implementation of a road map to prevent and reduce mercury use, emissions, and releases. While the history of gold mining in Rwanda dates back the early 1930s when gold mining practices were entirely artisanal, there has been some significant shift to small-scale and large-scale mining. The quantity of annual gold production has been increasing over the years, notably from 300 kg in 2015 to 5,898 and 11,532 kg in 2019 and 2020, respectively (NIRS, 2021)[16]. Due to the unavailability of quantitative information on mercury use in Rwanda's ASGM sector, global estimates of the country's contribution to the mercury releases and emissions have had a very high margin of error (UN Environment, 2017)[17]. Therefore, the country needed to undertake the NAP to ascertain the reported figures of mercury input to society by the ASGM sector, as well as to identify the levels of need for raising awareness, strengthening institutions and other needs in order to enhance effective management of mercury in accordance with the Minamata Convention.

Following the completion of the study on the national overview of the ASGM sector, the NAP was developed in July 2022 based on the findings from the baseline study and subsequent consultations with relevant stakeholders. An implementation plan and priorities for action, together with associated budget, were prepared. After the completion of the draft NAP report, validation workshops were conducted with relevant stakeholders to refine the report before submission.

16 NISR (2021) Rwanda Statistical Yearbook 2021, December 2021. National Institute of Statistics of Rwanda (NISR), Kigali, 173 pp. https://www.statistics.gov.rw/publication/statistical-yearbook-2020

17 UN Environment (2017) Global mercury supply, trade and demand. United Nations Environment Programme, Chemicals and Health Branch, Geneva

2. NATIONAL ASGM OVERVIEW

The analysis of the ASGM sector was conducted in May and June 2022 during the period when Covid-19 restrictions were relaxed in Rwanda, and therefore included both desk research and field surveys. The overview covered: (1) previous experiences in addressing ASGM, (2) geographical distribution of ASGM, (3) mining and processing information, (4) baseline estimates of the amount of mercury used in ASGM, (5) legal and regulatory status, (6) leadership and organization of ASGM at national and local levels, (7) mercury trade and demand, (8) demographic, social and economic aspects, (9) gold trade and supply chain, (10) environmental information, and (11) health information, in accordance with the guidelines and template from the UNEP Global Mercury Partnership (UNEP, 2022)[18]. Detailed methodologies for these sub-components are reported in Section.

This section provides a summary of the national baseline analysis of the ASGM sector.

2.1. Methodology for the National ASGM Overview

During this study, both primary and secondary data were collected. Prior to the data collection, UNITAR experts conducted a two-day training of the consultants and provided some analysis and guidance on the methodology used in the assignment.

2.1.1. Secondary data collection

Secondary data included both qualitative and quantitative data from both physical and electronic documents (desk review). The data were sourced from official websites and publications of institutions that include the National Institute of Statistics of Rwanda (NISR), Rwanda mining Board and REMA. Collected data and information include the trend of gold mining, gold mining processes and gold mining locations in Rwanda.

The review of documents and websites covered the standard methodology for ASGM assessment and included national policies and laws, national reports, regional policies and laws and scientific publications.

18 UNEP (2022) Template for a National Action Plan for Artisanal and Small Scale Gold Mining. UNEP Global Mercury Partnership, Geneva

2.1.2. Primary data collection

Primary data and information were collected at mining sites and surrounding communities. The data were collected using the data collection tools adapted from the UNITAR's Socio-economic ASGM Research Methodology (UNITAR, 2018)19 and UN Environment's Estimating Mercury Use and Documenting Practices in Artisanal and Small-Scale Gold Mining (O'Neill and Telmer, 2017)20. However, due to the observed absence of mercury use in Rwanda, none of the methodologies for mercury quantification was applicable in the current study. During this exercise, Focus Group Discussions (FGDs) with miners (men and women) and communities around the mining sites were conducted. To make the FGDs more practical, a group of 10 people (minimum) for each category was gathered and three experts facilitated the discussions. This allowed one expert to ask questions while others were recording the response from the group. With this approach, the miners were completing each other in their responses as one could support, provide additional information where another did not provide or contradict the urgement from his/her. For questions related to women treatment, a specific session was conducted with women as well one to one discussion between woman miner and the socio-economic expert who was also a female.



In addition, Key Informant Interviews (KIIs) were conducted with the purpose of collecting data and information from a wide range of people who have first-hand knowledge about the gold mining in Rwanda (Photo 2.1). The informants included community leaders, mining company leaders, staff of Rwanda Mines, Petroleum and Gas Board (RMB), healthcare professional in the mining areas, community health workers and officials from REMA.

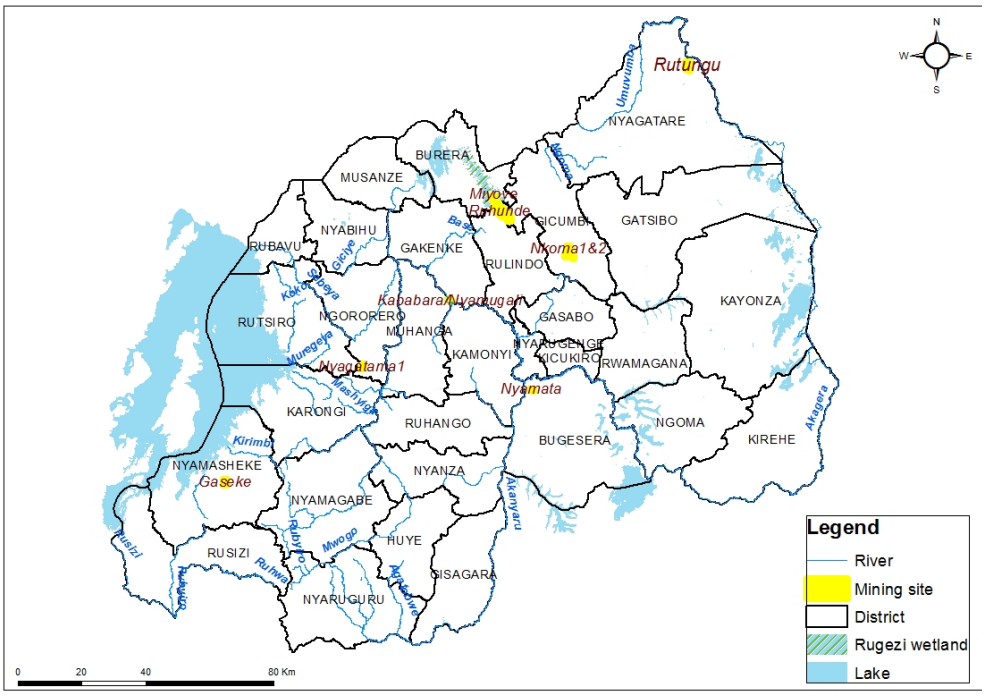
Photo 2.1 *Interview with key informants, Nyamiyaga mining concession*

19 UNITAR (2018) Socio-economic ASGM Research Methodology. Geneva, Switzerland. Authors: J.S. De Haan& B. Turner. http://www.unitar.org/cwm/portfolio-projects/artisanal-and-small-scale-gold-mining-asgm

20 O'Neill, J.D. and Telmer. K.H. (2017) Estimating Mercury Use and Documenting Practices in Artisanal and Small-Scale Gold Mining (ASGM). Geneva, Switzerland: UN Environment. http://wedocs.unep.org/handle/20.500.11822/22892

In all cases the discussions were aligned with prepared questionnaires and covered different aspects related to ASGM including laws, policies and regulations governing the mining sector, existing practices, potential opportunities for growth, and social and environmental issues, mercury use in the mining sector, gold trade supply chain, health related issues, gender related issues and formalization of the sector.

Geographical coordinates of gold mining sites were collected using a GPS during the field visit. Other coordinates were obtained from the RMB. Finally gold mining concessions were mapped by license type (exploration, small-scale and large-scale). During this process, pictures and video illustrating the current practices of gold mining process were taken.



Map 2.1 Location of 8 Visited mining concessions

Observation forms, which capture the community information, general site information, social dynamics at mine site and community, and environmental impacts at mine site and community were prepared and filled in during the survey.

It is important to mention that 8 concessions among 21 active concessions were visited. Those were selected in order to cover almost all regions of the country where gold is mined.

N.B: Since there are not known place in Rwanda where illegal mining is practised, this group was not considered during this research.

2.2. Previous experiences in addressing ASM

From the past years since the beginning of gold mining in Rwanda in the early 1930s, Rwanda has made some efforts to formalize the ASGM sector. These efforts include the review of the mining laws in consultation of stakeholders including mining companies and other public institutions. The review of mining laws generated the current mining law that does not recognize either artisanal or illegal mining in a bid to ensure that all mining activities are formal. Most artisanal miners are organised into registered cooperatives with a permit to extract gold under small- or medium scale mining. Thus, artisanal miners are largely defined by limited capital investment resulting in them generally achieving relatively low gold production. They commonly use own labour or may hire labour on short to medium term basis. Without a permit the miners are considered illegal, and therefore placing the need for continued formalisation efforts by government.

In addition, to the legal reforms, mining safety standards have been developed and disseminated to all mining companies and cooperatives and local governments as a way of consolidating efforts in ensuring safety in the mines. Countrywide campaigns on professional mining practices in addition to fighting illegal mining practices are part of the efforts to reduce the number of accidents in the sector. Other measures include suspension and sometimes revoking mining licenses of companies that do not meet health and safety standards, as well as encouraging miners to switch from artisanal mining to modern mining.

To improve the gold mining industry, the Government of Rwanda established the School of Mining and Geology at the University of Rwanda that was started in the academic year 2015/2016. It also established the Department of Mining Technology at the Integrated Polytechnic Regional College (IPRC), operating under umbrella of Rutongo Mining School. Most of the graduates of those programmes are being employed by the mining companies to fill the personnel requirements of Law N° 58/2018 of 13/08/2018 on Mining. Through the collaboration between RMB and IPRC, two batches of 44 mining inspectors

at RMB have undergone six month-long training that led to the award of certificates in Mining Technology (RMB, 2020)[21]. These initiatives improved the managerial skills in the mining sector including environmental laws compliance and minerals traceability. As reported by RMB, the RMB inspectors contributed to the compliance with the mining standards by different companies. Their role as well as the role company engineers as seen as one of the factors that has contributed a lot to the increase of the yield of the mining sector.

The Government of Rwanda has also addressed the ASGM sector through the enforcement of mining laws and between July 2016 and January 2022 there have been reports of confirmed arrests related to illegal mining activities. These include the arrests in Ruzisi District of men caught mining gold illegally, eleven in 2016 (RNP, 2016)[22], fourteen in 2020 (RNP, 2020)[23], and two in 2021 (RNP, 2021)[24].According to the vision of the RMB gold mining should be legal and up-scaled from artisanal to large scale. This shows the commitment of the RMB to legalise and formalise the mining sector.

Furthermore, recently RMB has benefitted from a project that was funded by Enabel entitled "Transfer of geo-data and knowledge in support of a Geo-IMS at RMB". The project has been carried out by RMCA and the key pillar of the project was to avail more exploration data, to improve the human capacity building and to establish Geo-IMS at RMB.

2.3. Size and geographical distribution of the ASGM sector

Currently, there are 21 regions in Rwanda where gold is being mined (***Table 2.1*** and ***Map 2.1*** and 13 other regions which are still under exploration phase ***(Table 2.2)***. The annex 1 gathers their geographical coordinates.

21 RMB (2020) Mining inspectors complete six-month intensive training in mining technology. Rwanda Mines, Petroleum and Gas Board(RMB), Kigali https://rmb.gov.rw/index.php?id=100&tx_news_pi1%5Bnews%5D=71&tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=f3c414d6bf3373952aec1c4461d0e6bd

22 RNP (2016, July, 27) 11 illegal miners arrested. Rwanda National Police (RNP), Kigali. https://police.gov.rw/media-archives/news-detail/?tx_news_pi1%5Bnews%5D=3735&tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=728be8ff756fcab95bec6f468705ce56

23 RNP (2020, July, 12) Rusizi: 14 arrested in illegal mining activities. Rwanda National Police (RNP), Kigali https://www.police.gov.rw/media-archives/news-detail/?tx_news_pi1%5Bnews%5D=15422&cHash=0c13a17448381224d533a6664d0350db

24 RNP (2021, December 20) Police arrest two illegal miners. Rwanda National Police (RNP), Kigali https://www.police.gov.rw/media-archives/news-detail/news/rusizi-police-arrest-two-illegal-miners/

The concessions of Bweyeye, and Nyamiyaga are the only active concessions containing operating on placer gold (alluvial, or secondary, deposits) while in the remaining concessions, gold is mined from primary deposits.

Table 2.1 *Active gold mining concessions and related information*

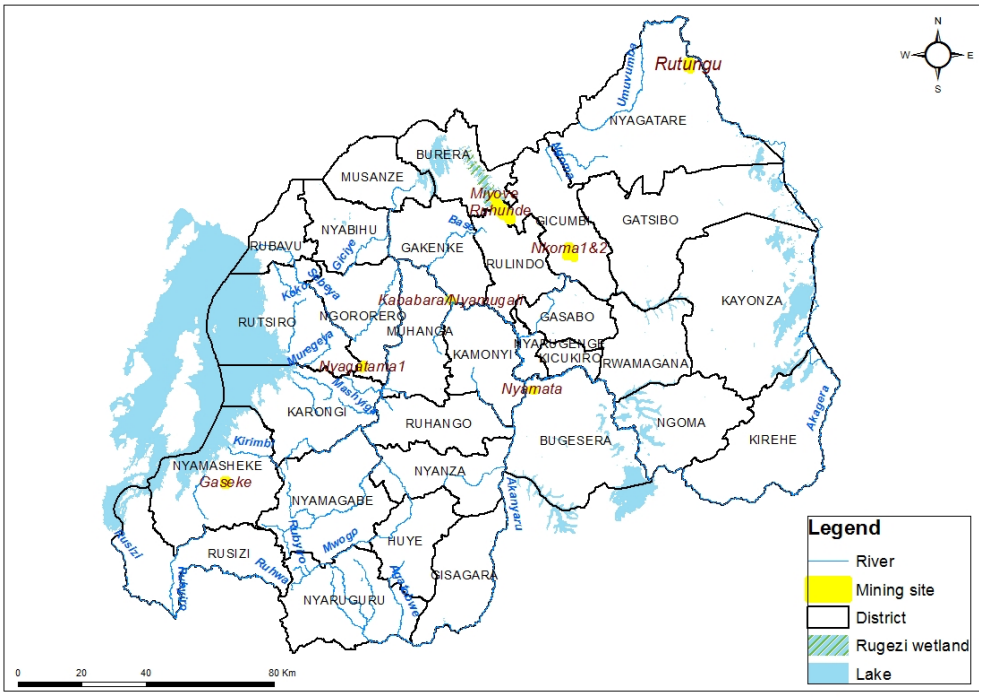
#	Name	Type	District	Sector	Cell	Village covered by the concession	Distance to:			Land cover
							School (m)	Health centre (m)	Business centre (m)	
1	Buturuba	SSML	Burera-Gakenke-Rulindo	Nemba-Gashenyi-Base	Kivumu,Rutabo,Rwamahwa	Mugano-Buturuba, Rubuga-Cyondo	1500	2500	5000	Forest, Seasonal crops, banana
2	Bweyeye 1	SSML	Rusizi	Butare	Nyamihanda	Kenya, Munkamba	1500	9000	2500	Forest, Seasonal crops, banana
3	Bweyeye 2	SSML	Rusizi	Bweyeye	Rasano	Kabuga, Runyami, Nyamirambo	1000	7000	800	Forest, Seasonal crops, Banana
4,5	Gaseke	SSML	Nyamasheke	Kanjongo	Susa-Raro	Kamuramira, Marongi, Ruganda-Rambura, Kamina, Rugeyo, Kamabuye	1200	1500	800	Forest, Seasonal crops
6	Kababara	SSML	Gakenke	Ruli	Gikingo	Karango, Bushoka, Rumasa	1000	4500	5000	Forest, Seasonal crops
7	Miyove-Rusekera-Mubuga-Gitovu-Ruhunde	SSML	Burera	Ruhunde	Gatare-Rusekera	Gatete, Rukingu, Terimbere, Nganzo, Ruganda, Gitwe, Gashinge-Matyazo	100	1500	4000	Forest, Seasonal crops
8	Miyove-Rusekera-Mubuga-Gitovu-Ruhunde	SSML	Burera	Ruhunde	Rusekera-Gitovu	Gasura, Rubyiniro, Rugambanyoni, Rusenge, Gatokezo, Tarasi, Matyazo-Cyasuri, Muremure, Ngoma, Kamonyi, Kaberano, Tetero	1000	100	500	Forest, Seasonal crops
9	Miyove-Rusekera-Mubuga-Gitovu-Ruhunde	SSML	Burera	Miyove-Nyankenke	Miyove,Mubuga-Rusasa	Murehe, Mpinga, Nyarubuye, Murambo, Mukaka, Kaje, Nyamiyaga-Birumba, Rembero, Nyangezi	800	50	500	Forest, Seasonal crops
10	Miyove-Rusekera-Mubuga-Gitovu-Ruhunde	SSML	Burera	Miyove-Ruhunde-cyungo-rukozo	Mubuga-Rusekera,Gitovu-Rwiri-mbuye	Rutovu, Mubuga, Gsura, Rubyiniro, Kirwa, Murambo, Tetero, Kaberano, Kivumu, Nyarusebeya, Musave, Gatare	3000	4	500	Forest, Seasonal crops
11	Miyove-Rusekera-Mubuga-Gitovu-Ruhunde	SSML	Burera	Miyove-Nyankenke	Mubuga-Miyove-Rusasa	Birumba, Kagote, Kirwa, Kivumu, Kabuga, Mubuga, Murambo, Gatare, Kivumu, Kacyiru, Gatsimbura, Kae, Murehe	100	1200	50	Forest, Seasonal crops
12	Nkanda	SSML	Nyaruguru	Busanze-Ruheru	Nkanda-Remera	Uwamakumba, Mutarama-Gitwa, Kivugiza	300	5000	2000	Forest, Seasonal crops
13	Nkoma1&2	SSML	Gicumbi	Nyamiyaga-Rutare	Mataba,Karambo, Kabeza-Bikumba	Murama, Kinyinya, Ruyaga, Mataba, Karambo, Matyazo	500	4800	4500	Forest, Seasonal crops, Banana
14	Nkoma1&2	SSML	Gicumbi	Nyamiyaga-Rutare	Karambo-Munanira, Bikumba	Kinyinya, Murama, Bushokanyambo, Ruti, Gasharu	2400	2100	3000	Forest, Seasonal crops, Banana
15	Nyagatama1	SSML	Ngororero	Nyange	Vuganyana	Nyagatama, Mbobo, Ngorore	400	4000	3800	Forest, Seasonal crops, Banana
16	Nyamugari	SSML	Gakenke	Ruli	Gikingo-Ruli	Gahondo-Kabingo	800	1400	1500	Forest, Seasonal crops
17	Nyamugari	SSML	Gakenke	Ruli	Gikingo-Ruli	Nyamugari, Kabingo-Gataba	600	1400	1500	Forest, Seasonal crops
18	Nyamugari	SSML	Gakenke	Ruli	Gikingo-Jango	Nyamugari-Kirehe, Kinyonzo	800	1700	1800	Forest, Seasonal crops
19	Nyarurama	SSML	Gicumbi	Ruvune	Gashirira	Nyarwina, Rugerero	1000	2800	3000	Forest, Seasonal crops, Banana
20	Nyirabahanga	SSML	Bugesera	Ntarama	Kibungo-Cyugaro	Rusekera, Nganwa-Cyugaro	1000	700	7000	Seasonal crops
21	Rutungu	LSML	Nyagatare	Rwimiyagaa	Rutungu	Rubira, Bwera, Gakagati	2400	8000	7500	Seasonal crops, wooded savannah

SSML: Small Scale Mining Licence, LSML: Large Scale Mining Licence

Table 2.2 Sites with gold exploration licence

#	Name	Type	District	Sector	Cell	Village covered by the concession
1	Burushya	EL	Gakenke	Cyabin-go-Busengo	Mutanda, Ruko-re-Mwumba, Birambo	Mucaca,Kigote,Rukore,Kam-bare,Cyabinggo,MureheN-yamugari,Rugandabare-Kir-wa,Biramb,Gitwa,Kamonyi
2	Burushya	EL	Gakenke	Cyabingo	Rukore	Nyamugali,Rukore,Kigote
3	Burushya	EL	Gakenke	Cyabingo	Rukore	Murehe
4	Kigarama Block	EL	Rusizi	Gitambi	Mashesha, Hang-abashi, Gahungeri	Kankuba,Kabonabose,Kaz-inda,Kamagaju,Karama,Idaga
5	Kigarama Block	EL	Rusizi	Gitambi-Gas-honga	Gahungeri, Kacyuma, Birembo	Kazinda,kamagaju,Nyanta-ba,Njambwe,Rango,Marib-a,Kigarama,karama
6	Kigarama Block	EL	Rusizi	Gitambi-Gas-honga	Gahungeri, Cyingwa, Mashe-sha-Kacyuma	Mubuga,Kigarama,Kamony-i,Kaninda,Kabugarama,Mp-inga,Mugenge,Rwihene,Ru-vuruga,Karama,Njambwe
7	Nyanza -Huye	EL	Huye-Nyanza	Rwaniro-Ny-agisozi	Nyaruhom-bo-Kirambi	kigarama,kibara,gasharu,nyabuen-gwe,mwezi,rugarama-mpaza
8	Nyanza -Huye	EL	Huye	Rwaniro-Kigoma	Nyaruhombo, Kamwam-bi-Rugarama	karambo,gakomeye,kamwam-bi,remera,murambi,kigara-ma,gafurwe,nyakabuye-ruhin-ga,kabumba,kanyurapfundo
9	Nyanza -Huye	EL	Nyan-za-Huye	Nyagisozi-Rwab-icuma-Rwaniro	Kirambi, Kab-irizi-Runga, Mubu-ga-Nyaruhombo	gasharu,mpaza,nyagat-ovu,kigarama,kadusanyi,k-abisine,rugarama,mwezi
10	Nyanza -Huye	EL	Huye	Rwaniro	Nyaruhombo, Mwendo, Kibiraro	rugarama,nyabujengwe,kibara,ki-garama,nyabisindu,mure-he,birambo,rugerero
11	Nyanza -Huye	EL	Huye	Rwaniro	Mwendo, Kibiraro, Nyaruhombo, Gatwaro	Amarongi,rumana,nyakabuy-e,gafurwe,nyarunyinya,nyabisin-du,kigarama,murehe,birambo
12	Nyanza -Huye	EL	Huye	Rwaniro-Ki-goma-Simbi	Rugarama, Kam-wambi, Kabatwa, Nyangazi	umuyange,sekera,igonde,birem-bo,kanyurapfundo,nyaruhimbya,n-yagahinga,birino,ruhinga,gakomeye. karambo
13	Nyanza -Huye	EL	Huye	Rwaniro-Kigoma	Gatwaro, Ruga-rama, Kamwambi, Nyangazi, Nyamabuye	kigarama,gatwaro,ru-mana,birino,ruhinga,ama-rongi,nyakabuye,karambo

EL: Exploration Licence



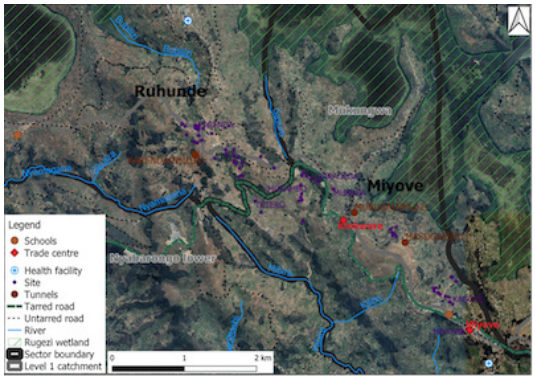
Map 2.2 *Location of active gold mining sites in Rwanda*

2.3.1. Regions with vein Gold deposits

Among 21 active gold concessions, 19 are for primary gold deposits. In the next paragraphs, Miyove, Ntarama, Ruli, and Bweyeye mining regions are described, while the table provides additional details regarding their size, their location, distances from the mining concession to schools and health centre.

Miyove mining area

Miyove is one of the richest areas in gold of Rwanda. The area is located in Northern Province, at around 67 km from Kigali city. It extends over three districts: Rulindo, Gicumbi and Burera which are part of the volcanic zone of Rwanda. The volcanic zone covers a larger part of the Northern Province and almost entire part of the western province of Rwanda. Up to now in that area, the mining is conducted through 72 well protected tunnels. ***Map* 2.3** gives an overview on the spatial distribution of the tunnels of different concessions of the area.



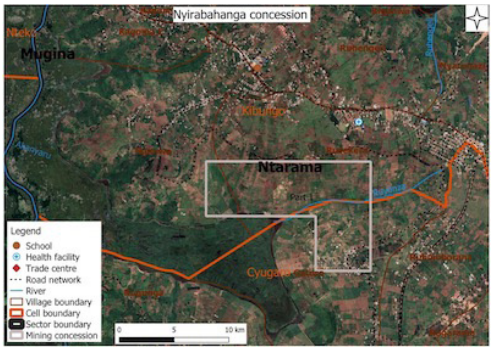
Map 2.3 *Spatial distribution of tunnels in Miyove mining region*

According to the map, the Kagobe and Musogwe concessions of Miyove area are located upstream of Rugezi wetland, which is a Ramsar site (***Map 2.3***). This location may present potential environmental issues including water pollution from the catchment of the wetlands. In addition, almost all the tunnels of Miyove mining area are located in agricultural area (with scattered houses) where most of farming activities are conducted on bench terraces that were established by the local community as one measures used to achieve a sustainable integrated watershed management.

The area is mined by Ngali Mining Limited from 2017 and has a monthly number of miners that ranges between 650-732. It is important to indicate that expropriation fees for the land that is occupied by the mining activities are agreed between the owner of the land and the mining company, though it should not go below the cost provided by the law. As component of the agreement, the owner of the land is allowed to use his land after the closure of the mining activities.

Nyirabahanga concession

Nyirabahanga concession is mined by B&K BUSINESS ACTIVITY LTD and is located in Bugesera district; Ntarama sector in Kibungo-Cyugaro cells. The mining concession covers an estimated area of 100ha. At 1 km from the concession, there are grouped settlement and business centres that serve the surrounding community including miners. The main economic activity around the concession is agriculture of seasonal crops and banana. The concession shares the boundary downstream with Akanyaru wetland and Ruyonza River (***Map 2.4***).



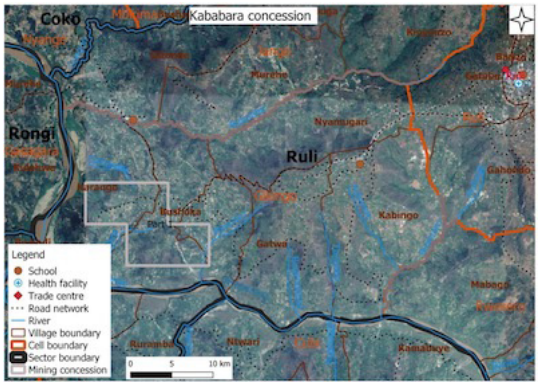
Map 2.4 *Physical and socio-economic features of Nyirabahanga/Ntarama concession*

At this mining concession, mining activities are conducted in less steep area through inadequately protected tunnels. In total, the concession employs 90 miners from which only 15 are women.

Mining area and concessions managed by COMIKAGI

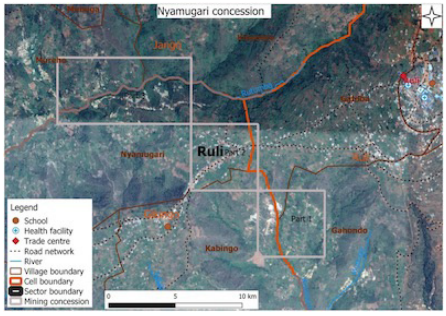
Located in Ruli sector of Gakenke District in Rwanda's Northern Province, COMIKAGI is one of the gold mining cooperative, which was in the past known only for cassiterite-tantalite mining. COMIKAGI oversees production across its 812 ha, five-year renewable licences in four main areas (parts).

Kababara concession is located in Gakenke district; Ruli sector in Gikingo cell and covers an estimated area of 100ha (Map 2.5). The concession is upstream of Nyabarongo river and has been contributing to the sediment load of this river.



Map 2.5 *Physical and socio-economic features of Kababara concession*

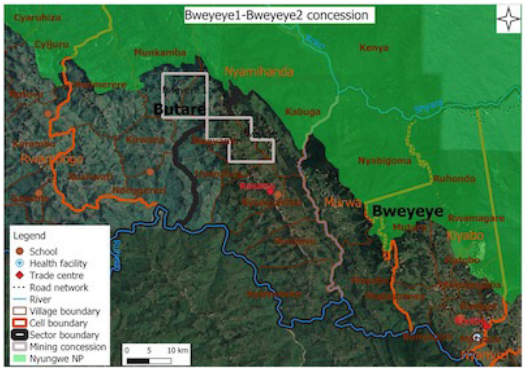
At 1 km from the concession, there are grouped settlements. It is important to indicate that the area is predominated by agricultural activity of seasonal crops (including beans, potatoes and maize), banana and forest. In the same district, COMIKAGI cooperative owns an other big concession located in Ruli sector, Gikingo, Ruli, and Jango cells. The concession is divided into 3 parts (***Map 2.6***). Part 1 and 2 are located in Rusororo catchments, at around 1.8 km from Nyabarongo river, and part 3 is located along Rutumba river which highlights its impact to the river.



Map 2.6 *Physical features of the area and concessions managed by COMIKAGI cooperative*

Rusizi- Bweyeye mining area

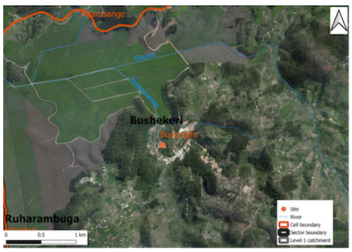
Rusizi- Bweyeye is mined by New Kush Rwanda Ltd. The area is located in Rusizi district and extent over four sectors: Bweyeye-Butare-Gikundamvura-nyakabuye sector (***Map 2.7***). The cells of those sectors that accommodate the mining activities are: Rasano, Murwa, Kiyabo, Gikungu, Nyamuzi-Nyamihanda, Rwambogo, Butanda, Gatereri-Mpinga-Nyabintare cells. In total, the mining area totalizes 6375 ha. The concession is located upstream of three tributaries of Lake Kivu: Ruhwa, Koko, Kabingo and Mwoya rivers.



Map 2.7 Rusizi- Bweyeye mining area

2.3.2. Regions with alluvial gold deposits

Unlike the above case, Gisakura/Nyamasheke and Nyamiga/Gicumbi alluvial deposits are mined from the hills and within a wetland where gold has been deposited by the runoff from the surrounding areas. The concession of Gisakura/ Nyamasheke (Map 2.8) is located at 1.5 km from the national park of Nyungwe that is known as the richest reservoir of Gold in Rwanda. However, it is not extracted since the park is a protected area which is one UNESCO heritage.



Map 2.8 Gisakura/ Nyamasheke mining site

On the other hand, in Nyamiyaga gold is mined from a wetland (Map 2.9) and in total the concessions possess three important mining sites in series.



Map 2.9 Nyamiyaga mining concession

At Gisakura concession, the number of miners range between 324 and 412 per month while, this number varies between 500 and 200 at Nyamiyaga concession. The lowest number is observed during the rainy season as the area is often flooded due to runoff from upstream. In addition, during the rainy season, most of miners choose first to cultivate their fields as mining activities are unable to meet all demands of their family mainly the food security.

2.4. Demographic, social and economic information

In general, mining is practised in remote areas of Rwandan rural zones. The number of workers cannot be established accurately since many of them are not full time and permanent miners. However, the number of miners per concession/ site could range from 230 to 661 (Table 2.3). The major reason for the fluctuations in the number of mine workers was that the incomes from mining were not enough to sustain them throughout the year, and therefore resorted to alternative livelihoods such as agriculture. Other reasons could be lack of capital to acquire equipment suitable to access the ore or inadequate skills to sustain the enterprise. In addition, all sites were not visited as previously indicated. However, from eight visited gold mining concessions, there is an average of 448 workers per concession, giving a total population of approximately 9408 from the 21 active concessions in Rwanda (Table 2.3). A more accurate approximation may be expected after the completion of the 2022 population census that is underway.

Table 2.3 *Demographic statistics from visited sites*

No	Name of the company	Site	Number of males	Number Of females	Total
1	Ngali Mining Ltd	Ruhunde	430	39	469
2	Ngali Mining Ltd	Miyove	594	67	661
3	COMIKAGI Ltd	Kababara & Nyamugali	400	163	563
4	Niyigena Mining Company Ltd	Nyagatama 1	500	40	540
5	WAYCOR Ltd	Rutungu	482	23	505
6	Ngali Mining Ltd	Gaseke/ Nyamasheke	314	28	342
7	U.H Mining Company Ltd	Nkoma 1 &2	240	30	270
8	B & K Business group	Nyamata	184	46	230
Total			3144	436	3580
Average			393	55	448

The hierarchies of staff in the mining companies, in general, include skilled workers specialized in one or more aspects of mining (such as: geologist engineer, mineral processing engineer, environmentalist engineer and mineral processing engineers). In all mining areas, those skilled workers stay in the mining area during the working day and go to visit their families during the weekend.

Most of the miners in charge of ore extraction and related works are based in local communities surrounding the mining concessions. Ordinary people with residence in the zone of concession share other aspects of social life with other local community members who are not involved in mining. In general, mining is practised to supplement agriculture activities. Thus, for most of the respondent (miners), the activity is a way of making income necessary to run farming activities. Thus, the salary from mining activities, according to them, helps them to buy seeds, manure fertilizers and to pay cultivators who actually earn three times less than the miners' daily salary. The money also helps them to run small businesses, to finance other family social needs such as health care and children school fees. .

2.4.1. Men in ASGM

Based on the situation in visited concessions, men are predominant in all positions, including senior positions. From the collected data, men represent 88 % of workers and they are generally young between 21-35 years.

The predominance of males was reported to be linked to the nature of work, which is perceived to be too physical for women. However, the issues of gender inequalities that could be culturally based cannot be ignored. Men are culturally linked to higher salary activities than women, while women are associated with domestic responsibilities and related unpaid farming activities.

2.4.2. Women in ASGM

In general, Rwanda's mining sector has seen a significant rise in the number of women taking interest and joining the industry in all aspects. According to figures published in March 2021 by the National Institute of Statistics of Rwanda (NISR), 11.4% of workers across all thirty districts are women. In this study the proportion of women was 12% (Table 2.3).

Furthermore, a total of 22 women were found in mines and quarrying businesses as owner of the company, company shareholdersor cooperative members. In addition, 20 female environmental officers, 23 female graduate mining engineers and geologists, and 43 females field technicians were present in different concessions during the study period.

They are also encouraged by the availability of mining programs and courses at learning institutions like the University of Rwanda (School of Mining & Geology) and IPRC Kigali, and the establishment of gender-sensitive mining laws, regulations, and policies that the Rwandan government has put in place.

To ensure Rwanda's success in the mining sector in terms of gender equality, Rwanda Mines, Petroleum and Gas Board (RMB), with support from the German Agency for International Cooperation (GIZ) and other stakeholders, joined efforts to develop a gender strategy for Rwanda's mining sector. The strategy includes measures to promote the advancement of women in the mining and quarry workforce, and in the ownership of the same businesses25.

The participation of women in ASGM activities was found to be considerably low (12%) compared to men. Most of them are either single mothers who use the mining income to sustain their family or just single who want to become economically independent. The absence of married women in the mining sector was due to three main reasons. The first reason was that women tend to stay at home and conduct the agricultural activities and then the income from mining come as a supplement. This system is crucial for families as they use the mining income to hire a cultivator who works on a regular basis in their farmland under the supervision of the woman. The second reason was the worry of a mining accident that could kill both of the married couple if they are working in the mines, a situation that can affect the future of their children. The third reason is linked to domestic gender role of women in child care. This has been a barrier for women to participate in jobs that generate money which in most of the cases are conducted away from their families.

Regarding the working conditions, men and women are treated similarly as they work to the same deadlines and use the same ablution facilities regardless of specific needs that are female related. There is therefore inadequate privacy that female miners may need and therefore could be culturally degrading. Women undertake the same mining activities as men, except when the tasks are too difficult for women to do. Women also tend to carry out duties such as cleaning and preparing food, which are traditionally considered to be duties of female workers. Women are involved in fetching water that is used by miners during the mineral purification process like panning and sluicing.

25 MoE, 2022. Gender Strategy For The Mining Sector In Rwanda, https://rmb.gov.rw/fileadmin/user_upload/GENDER_STRATEGY.pdf

Apart from the direct participation in mining, women are also involved indirectly since they run small business around gold concession. In Miyove concession women were found selling lunches to miners although the informal business is not allowed. In additional, in centers closer to the mining concessions women are running small boutiques and restaurants, and miners are among their first clients.

2.4.3. Youth in ASGM

The national youth policy of 2005 defines young as someone who is 15-35 old. On the other hand, in line with the MDG on education particularly, the Government of Rwanda committed itself to advancing Education For All (EFA), thus progressively rendering the primary education free, then established a free 9 Years Basic Education (YBE)and later the 12YBE which is implemented and monitored in decentralized manner by both local government leader at different levels (district, sector, cell, villages and ten cell unit) and teachers.

The implementation of this policy contributed to the reduction of rate of youth below 18 years old in different sectors including the mining sector.

In all visited concessions, most of miners are below 45 years old and most of them were youth. For example, in Ruhunde concession 65% of miners are 20-35 old, 25 % are above 36 years old, and data from Nyamiyaga concession show that 47% of miners are youth between 25 and 34. Most of them are head of young families and see the mining activities as sources incomes that will help the family to grow.

2.4.4. Children in ASGM

Like in the above case (section 2.4.3), children are also required to attend school. Therefore, in all mining concessions visited by the research team, there was no sign of children involved in mining. The awareness of the age to consider during the recruitment was also indicated by the site's leaders. According to them, they cannot recruit minors (children) since the basic document to provide for recruitment is the National ID which can only be issued to young of at least 16 years old. Children are not involved directly in mining activities since anyone below 18years old must be at school. The follow up of employment of children

is ensured by a continuous monitoring by local authorities, mining inspectors and at school, teachers reinforce the 12 YBE by reporting regularly the cases of dropout to the local leaders for follow up.

2.4.5. Education

In general, mine workers have basic reading and writing skills since they can point and verify themselves their attendance list. The roles of women include office security, ore transport and maintenance of hygiene at workplace. These roles are generally considered to require minimum formal education. Men are involved in more muscle straining activities that include mining, panning, suiciding and construction. According to the 2020/21 Education Statistical Yearbook (MINEDUC, 2022)[26], most learners in Rwanda are attending the primary education level.

Most of the gold mining concessions are located in isolated areas from other social and economic infrastructure of the community. These locations generally create challenges in monitoring activities between the school and their home may resulting in poor attendance and dropouts in schools. However, the Education Sector Policy (MINEDUC, 2003)[27] combined with other efforts towards the children right protection from the Ministry of Gender and Family Promotion (MIGEPROF) and its affiliated institutions as well the Ministry of Local Government (MINALOC) has resulted in higher attendance of primary school by children. On average pupils from families around the ASGM activities walk 1.1 ± 0.8 km to reach the schools (see Table 2.2). The same table summarizes the approximate distance from the mining region to other facilities such as the business centres and health centres.

Mining companies have the responsibility of educating the miners about certain socio-economic behaviours such as saving, adherence to medical insurance and the recently introduced Long Term Saving Scheme (EJOHEZA) which was established by the Government of Rwanda through the Ministry of Finance under the Law No 29/2017 of 29th June 2017. This is a contribution scheme,

26 MINEDUC (2022) 2020/21 *Education Statistical Year Book*, Kigali. Available on https://www.mineduc.gov.rw retrieved on June 28/2022.

27 MINEDUC (2003) Education sector policy. Ministry of Education, Science, Technology and Scientific Research (MINIEDUC). Kigali. https://www.mineduc.gov.rw/index.php?eID=dumpFile&t=f&f=5824&token=5516b6574489a54e85e2199c27bc2855f3f2e67e

established on voluntary basis by opening a savings account with a scheme administrator, the Rwanda Social Security Board (RSSB), and covers both salaried and unsalaried people.

In addition to that, they are also trained on mining safety and health risks associated with mining activities such as STDs, their prevention strategies and management. Such trainings are also provided to the community closer to the mining concessions during the meetings that take place each last week of month after the community work. In addition to those topics, local community are instructed to avoid entering in the concessions.

2.5. Legal and regulatory status

The hierarchy of laws in Rwanda follows the order: (1) The Constitution (Supreme Law in Rwanda); (2) Laws; (3) International Treaties and Agreements; and (4) Orders (Presidential, Prime Minister's and Ministerial Orders). The management of mercury, including handling, storage, use and disposal, is not specifically aligned to a single piece of legislation, and some pieces of legislation may have direct or indirect implication on mercury management, even though there do not explicitly mention mercury. According to Article 7 (Paragraph 2) of the Minamata Convention Parties are required to take steps to reduce and where possible eliminate the use of mercury in the ASGM sector and its release to the environment from mining and processing. Rwanda mining is largely governed by the Law N° 58/2018 of 13/08/2018 on Mining and Quarry Operations (MoE, 2018)[28]. In addition to the Law on Mining and Quarry Operations Table 2.4 shows selected legal instruments with direct or indirect influence on ASGM activities in Rwanda.

Some of the main provisions of the law on Mining and Quarry Operations include the obligation to carry out environmental and social impact assessment before commencing mining or quarry operations. This applies to all scales of production. The law insists on the safety of the communities that surround mines. It mentions penalties provided, , to mining companies or individuals who could illegally operate the business. Those penalties include jail terms and fines

The law provides for demarcation of potential mining areas which are economically viable in order to promote investment in mining, It also provides guidance for mineral trading licence, mineral processing licence and the mining support

28 MoE (2018), LAW N° 58/2018 OF 13/08/2018 ON MINING AND QUARRY OPERATIONS available at: https://rdb.rw/eia/mining-law.pdf

services license. The law is seconded by the LAW N°55/2013 OF 02/08/2013 on Minerals Tax (MINECOFIN, 2013)[29]. This Law establishes a tax on minerals. Classification of minerals, payment of tax on minerals any person who sells minerals shall pay a tax on such minerals, Tax procedure, Exemption of tax on minerals.

The mining law is supported by different regulations most of them being gazetted in 2019. Those include:

1. Regulations of the Chief Executive Officer N° 005/MINES/RMB/2019 of 18/07/2019 MoE, 2019)[30]. This regulation determines: (a) potential mining areas, (b) criteria for categorisation of mines, (c) modalities and requirements for mineral licence application and for tenders, (d) demarcation of potential mining areas and conditions for mineral exploration and exploitation, (e) criteria for categorisation of mines, (f) modalities and requirements for acquisition and renewal of a mineral licence, (g) mineral licence fees.

   According to the regulations N° 005/MINES/RMB/2019 only three categories of mining are recognized by the Government of Rwanda. Those are **large scale mine, medium scale mine and small scale mine**. Artisanal gold miners normally form part of registered cooperatives with permits to extract gold under small- or medium scale mining. Without such permit the miner is considered illegal.

29 MINECOFIN (2013), LAW N°55/2013 OF 02/08/2013 ON MINERALS TAX, available at https://www.rmb.gov.rw/fileadmin/user_upload/Royality__law.pdf

30 MoE (2019) Regulations of the chief executive officer n° 005/mines/rmb/2019 of 18/07/2019 determining potential mining areas, criteria for categorisation of mines, modalities and requirements for mineral licence application and for tenders, available at: https://rmb.gov.rw/fileadmin/user_upload/Regulations_of_the_CEO_No_005.MINES.RMB.2019_of_18.07.2019_determining_potential_mining_areas__criteria_for_categorisation_of_mines__modalities_and_requirements_for_mineral_license_application_and_for_tenders.pdf

Table 2.4 *Selected legal instruments directly or indirectly governing ASGM activities in Rwanda*

Legal instrument	Aspects of Convention addressed	Remarks/Gaps
Law N° 58/2018 of 13/08/2018 Exploration, exploitation, processing or trade of any mineral or quarry	Sets requirements for exploitation, processing or trading of any mineral or quarry	Absence of provisions on managing intentional and unintentional mercury releases to the environment from gold mining activities
Law N° 48/2018 of 13/08/2018 on Environment	Law (Article 45) prohibits the purchase, sell, import, export, transit, store and pile chemicals, diversity of chemicals and other polluting or dangerous substance Prohibits and import of any other product harmful to human health and environment. Mercury indirectly implied in the Article	Need to consider elemental mercury use in mining activities to potential use of mercury in future ASGM activities
Ministerial Order N° 005/2008 of 15/08/2008 Establishing Modalities of Inspecting Companies or Activities that Pollute the Environment	Sets the modalities of inspecting companies or activities that pollute the environment. Authorities can conduct inspection in companies or activities to make sure the environment is conserved and protected	Need capacitation to inspect for mercury use in ASGM sector, and technological capacity to recommend effective mercury-free technologies for gold processing
Chief Executive Officer No 001/Mines/Rmb/2019 of 18/07/2019	Potential mining areas, criteria for categorisation of mines, modalities and requirements for mineral licence application and for tenders Demarcation of potential mining areas and conditions for mineral exploration and exploitation,	Include the definition of artisanal mining
Chief Executive Officer N° 003/Mines/Rmb/2019 of 18/07/2019	Mineral processing licence Mineral trading licence (import/export)	None
Ministerial Order N° 003/2021 of 08/02/2021 Determining the List of Chemicals and other Polluting Substances that are not Permitted	Mercury compounds, including inorganic mercury compounds, and alkyloxy alkyl and aryl mercury compounds are on the list of prohibited chemicals Prohibits mercury compounds use, purchase, sold, import, export, transit, storage and pile or distribution for free	Need to consider elemental mercury use in mining activities to potential use of mercury in future ASGM activities
Ministerial Order N° 003/16.01 of 15/07/2010 Preventing Activities that Pollute the Atmosphere	Prohibits emission of chemicals, materials, gas or hazardous substances unless such emission is authorized by the National Authority in charge of the protection of environment (Article 6)	No definition of mercury emission sources or inclusion of mercury amalgamation processes in ASGM; absence of control measures on mercury emission sources
National Environment and Climate Change Policy (2019)	Promotes the sound management of chemicals and hazardous wastes in accordance with agreed international frameworks (such as the Stockholm, Basel and Rotterdam Conventions) Domesticates chemical and chemical waste Multilateral Environmental Agreements	Limited progress in generating supporting regulations, guidelines and standards covering mercury waste
Health Sector Policy (2015)	Informing and mobilising the general population about risk factors such as environmental pollution Occupational Safety and Health (OSH) related risks assessment and coming up with appropriate preventive measures Qualifying Occupational diseases, raising awareness on OSH among Health Sector Workers Conducting medical check-ups for Workers, promoting more extensive reporting on OSH, Integrating OSH into different Health Sector legislations and develop OSH specific regulations for Health Sector	Priority areas of intervention do not explicitly talk about occupational exposure to mercury in different sectors including the ASGM sector

A large scale mine must: (1) have a size of mining block exceeding hundred hectares (100 ha) but not exceeding four hundred hectares (400 ha);(2) have a licence of a maximum term of fifteen (15) years renewable; (3) use appropriate modern and efficient equipment and technologies in mining operations, mineral processing, metallurgy and environmental management; (4) have high degree of mineral processing up to export grades as may be stipulated by the Chief Executive Officer; (5) employ qualified mining staff, including a mine manager, professionals in charge of mining engineering, mineral processing, environmental management, health and safety and community relations, (6) be owned by local or foreign nationals.

A medium scale mine must: (1) have a maximum size of mining block of more than fifty hectares (50 ha) but not exceeding hundred hectares (100 ha); (2) have a mineral license of a term of ten (10) years renewable; (3) use appropriate modern and efficient equipment and technologies in mining operations, mineral processing, metallurgy, and environmental management, (4) have high degree of mineral processing up to export grades as may be stipulated by the Chief Executive Officer; (5) be able to employ qualified staff; (6) be owned by both local and foreign nationals, with at least forty percent (40%) of local shareholders.

A small scale mine (1) have a maximum size of mining block of fifty hectares (50 ha); (2) have a mineral licence of five (5) years renewable; (3) use appropriate modern and efficient mining equipment; (4) employ qualified mining professionals; (5) be owned by Rwandan nationals.

Article 54 of the law N° 58/2018 of 13/08/2018 on mining and quarry operations, states that; any person, who undertakes mineral or quarry exploration, exploitation, processing or trading without a licence, commits an offence.

Upon conviction, the offender is liable to imprisonment for a term of between two and six months and a fine of not less than Frw1 million and not more than Frw5 million or only one of these penalties.

The court also orders confiscation of any seized minerals or quarry in storage, trading or processing without a licence.

2. Regulations of the Chief Executive Officer No 001/Mines/RMB/2019 of 18/07/2019 (MoE, 2019)31. The regulations determine the nature, amount and deposit of the Environmental Rehabilitation Guarantee. The regulation

31 MoE (2019), Regulations of the Chief Executive Officer No 001/Mines/Rmb/2019 Of 18/07/2019

requires the mining or quarry licence holder to rehabilitate the environment in respect of any degradation because of the mining or quarrying operations. To ensure the compliance with the regulation, the mining license pays the rehabilitation guarantee that equals the budget of the liabilities of the mining or quarry licence holder under the environmental management plan. At the end of the rehabilitation, the licence holder is provided with the certification of completion of environmental rehabilitation and is then refunded.

3. Regulations of the Chief Executive Officer N° 002/Mines/Rmb/2019 Of 18/07/2019 (MoE, 2019)[32], determining the Provision of Services Relating To Mining And Quarry Operations. It issues the regulations related to (1) classification and updating services relating to mining and quarry operations, (2) modalities for licensing services relating to mining and quarry operations, and (3) rights and obligations of service providers of mining and quarry operations

Regulations of the Chief Executive Officer N° 003/Mines/Rmb/2019 of 18/07/2019, determining the Content of Mineral Processing and Trading Licences and Modalities of their Granting (MoE, 2019)[33]. They cover (1) modalities for granting a mineral processing licence,(2) modalities for granting a mineral trading licence, (3)rights and obligations of a holder of a mineral trading licence, (4)fees applicable to mineral processing and trading licences, and (5) transitional and final provisions

Regulations of the Chief Executive Officer N° 004/Mines/Rmb/2019 of 18/07/2019, determining the Format and Content of a Mineral Licence and the Content of an Agreement With a Mining or Industrial Quarry Licence Holder (MoE, 2019)[34], determines (1) the format and content of a mineral

Determining the Nature, Amount and Deposit of Environmental Rehabilitation Guarantee https://rmb.gov.rw/fileadmin/user_upload/Regulations_of_the_CEO_No_001.MINES.RMB.2019_of_18.07.2019_determining_the_nature__amount_and_deposit_of_environmental_rehabilitation_guarantee.pdf

32 MoE (2019), Regulations of the chief executive officer n° 002/mines/rmb/2019 of 18/07/2019 determining the provision of services relating to mining and quarry operations, available at : https://rmb.gov.rw/fileadmin/user_upload/regulations_of_the_ceo_no_002.mines.rmb.2019_of_18.07.2019_determining_the_provision_of_services_relating_to_mining_and_quarry_operations.pdf

33 MoE (2019), Regulations of the chief executive officer n° 003/mines/rmb/2019 of 18/07/2019 determining the content of mineral processing and trading licences and modalities of their granting, available at: https://rwandatrade.rw/media/Regulation%20N°%20003%20of%2018-07-2019%20on%20the%20content%20of%20mineral%20processing%20and%20trading%20licences%20and%20modalities%20of%20their%20granting.pdf

34 MoE (2019), Regulations of the chief executive officer n° 004/mines/rmb/2019 of 18/07/2019 determining the format and content of a mineral licence and the content of an agreement with a mining or industrial quarry licence holder, available at: https://www.rmb.gov.rw/fileadmin/user_upload/regulations_of_the_ceo_no_004.mines.rmb.2019_of_18.07.2019_determining_the_format_and_content_of_a_mineral_license_

licence , (2) Content of an agreement for exploration of mineral or industrial quarry, (3)Content of an agreement for mineral or industrial quarry exploitation for large scale mining, (4) Content of an agreement for mineral or industrial quarry exploitation for medium scale mining, (5) Content of an agreement for mineral or industrial quarry exploitation for small scale mining

Regulations of the chief executive officer n° 005/mines/RMB/2019 of 18/07/2019 determining potential mining areas, criteria for categorisation of mines, modalities and requirements for mineral licence application and for tenders. issues the following regulations:

(1) demarcation of potential mining areas and conditions for mineral exploration and exploitation, (2) criteria for categorisation of mines, (3) modalities and requirements for acquisition and renewal of a mineral licence, (4) modalities and requirements for acquisition of a mineral licence through tender, (5) mineral licence fees,

Regulations of the chief executive officer no 006/mines/RMB/2019 of 18/07/2019 determining the volume of mineral ore samples. it issues the following regulations: (1) List of metallic mineral ore samples, (2) List of non-metallic mineral ore samples, (3) Limit of the quantity of mineral ore samples, (3) Sending mineral ore samples abroad, (4) Submission of laboratory results

4. Ministerial Order N° 007/01 Of 19/07/2019 Repealing Ministerial Orders Related to Mining and Quarry Operation (MoE, 2019)[35],

Ministerial Order N° 013/Moj/Ag/19 Of 16/07/2019 Determining Requirements for Granting Authorisation To Import, Manufacture, Transport, Trade and Use Dynamites in Mining and Quarry Operations (MoE, 2019)[36]. it covers

and_the_content_of_an_agreement_with_a_mining_or_industrial_quarry_license_holder.pdf

35 MoE (2019) Ministerial order n° 007/01 of 19/07/2019 repealing ministerial orders related to mining and quarry operations, available at: https://rmb.gov.rw/fileadmin/user_upload/Ministerial_Order_No_007.01_of_19.07.2019_repealing_Ministerial_Orders_related_to_mining_and_quarry_operations.pdf

36 MoE (2019) 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, available at: https://rmb.gov.rw/fileadmin/user_upload/ministerial_order_no_013.moj.ag.19_of_16.07.2019_determining_requirements_for_granting_authourisation_to_import__manufacture__transport__trade_in_and_use_dynamites_in_mining_and_quarry_operations.pdf

the issues related importation of dynamites, (2)transportation of dynamites , (3) storage of dynamites, (4) use of dynamites , (5) manufacture of dynamites , (6) trade in dynamites , (7) monitoring of stores and disposal of dynamites

Labour Law in Rwanda of 2018. This law covers many aspects related to labor including the responsibility of the employee, the responsibility of employer, prohibited practices, etc.

Occupational health and safety

For example, the entire of Chapter V (Articles 77 – 82) is dedicated to occupational health and safety. In this chapter it is well articulated that the employer is required to maintain a safe and healthy work environment. In particular, the law requires the following of the employer in regard to occupational health and safety:

- Employer to ensure safe and healthy conditions in premises at employers cost
- Occupational health and safety committee to be set up in organization
- Personal protective equipment to be provided for hazardous work instructions and verification for use
- First-aid, firefighting and protective measures to be put in place
- Employer required to fight and prevent occupational diseases including assessment and policy among
- Others, etc

The laws of Rwanda eliminate many potential causes of grievances in the workplace by prohibiting some forms of child labour, all forms of discrimination, forced labour, and sexual harassment. Minimum age for admission of employment is 16 years except that 13 – 15 years old children can do light work under apprenticeship.

Children who are 13 years old and above can be employed for light work which does not have detrimental effect on education, health and physical development or other aspects of child's interest (Art.3). What is light work and what is not will be determined by a ministerial order.

This Law provides also tight sanctions to individuals or private agencies employing children in hazardous works[37].

In general, the implementation of the above regulations is facilitated by a decentralized administrative structure with an extensive local government that encourages citizens' participation in local decision making, implementation of different policies and monitoring at the lowest level (Village and ten cells). This administration facilitates effective communication, awareness and collective action.

2.6. Leadership and organization of artisanal gold mining cooperative and companies

The mining sector is governed by the policy, law and regulations as indicated in Section 2.5. The field data analysis revealed that almost all concessions are managed differently, though some have similarities. This difference in management is due to different reasons including the owner or the founder of the company or cooperative. Here are examples of managerial practices identified in different companies and cooperatives:

Before 2012 the concession Miyove of Burera, Gicumbi and Rulindo districts were mined by the local community, where each person holding a land with gold was conducting the mining activity in their land either by hiring the miners or by themselves mining. This practice was affecting both human health and the environment in several ways including the loss of life through accidents, development of diseases, and pollution of the Rugezi wetland by a higher load of sediments. In 2017 when those sites were handed to Ngali Ltd (which is a large-scale gold mining company), the first step made by Ngali Ltd was to group people who had fields with gold and who were committed to mine collectively as cooperatives. To eliminate the indigenous practices (dry grinding of minerals that was causing a tuberculosis like diseases, unprotected tunnels that was leading to accidents, sluicing in water bodies that was contributing to water pollution, use of only hands tools, such as picks, hammers and shovels, artisanal drill bit, metallic motor and pestle and minerals crusher, sacks), Ngali Ltd supported the cooperatives financially and technically. The financial support provided to each cooperative included the provision of funds for different materials used in mining such as the ball milling machines, junk hammers and

37 MIFOTRA(2018) Rwanda labour law, https://www.ilo.org/dyn/travail/docs/530/rwanda_labour_law.pdf

PPEs. The PPEs included boots, dust mask, gloves, salopet and helmet with a lamp. For technical support, Ngali Ltd intervenes in exploratory and designs of different tunnels owned by cooperatives

Within those cooperatives, members are shareholders with equal rights to the incomes from the mining activities that are conducted by the miners hired by their respective cooperative, while the total yield (concentrate) from the concession is sold to Ngali Ltd at a fixed price

In addition, Ngali Ltd has its own miners who are hired to extract gold from concessions which are not owned by cooperatives. In both cases, the salaries of miners is the same in order to harmonize the profession. In addition, all miners are paid monthly through their bank accounts.

However, this organization is not yet established in Nyamasheke mining concession, which is located in the south-western part of Rwanda. However, people who were mining on their own joined Ngali for several reasons. Those include for example, the accidents that used to occur in the area. For example, in 2018 two people died because of mining accidents in Nyamasheke38. Another reason is the frequency of long period by illegal miners without finding gold while their families rely on them. According to them, this prolonged period without finding gold was a cause of ongoing hunger in their families as the parallel agricultural activities were not enough to support the family.

At Nyamiyaga/ Gicumbi mining concession, the organization is completely different from others. At that concession miners could be paid by the company: (1) according to number of days worked per month and the daily rate, or (2) could group themselves into small groups and get paid according to the quantity of mined gold. The decision between option 1 and option 2 depends on the miners themselves. However, the miners have the flexibility of shifting from one option to the other. This approach is shared by almost all of the companies that are owned by one or very small groups, such as B&K, NEW KUSH RWANDA ltd and Niyigena mining company.

38 https://allafrica.com/stories/201803050128.html

Furthermore, for the cooperative the leadership seems to be more established. For example COMIKAGI has a managerial structure consisting of 35 members, each of whom owns a single profit share in the entity. As the holder of the mining title, COMIKAGI must comply with all associated obligations directly.

There are 70 active sub-contractors working under COMIKAGI (10 of whom are women), who oversee 5–20 workers each. Only a portion of sub-contractors are cooperative members and all either own the land on which they work or have an agreement (e.g., monthly rent) with landowners. Sub-contractors hire workers either in teams or as individuals. Relationships between sub-contractors and their workers are based on verbal agreements, providing uncertainty concerning working obligations and increasing risks of disputes.

2.7. Mining and processing information

2.7.1. Alluvial Mining

Extraction:

As previously indicated, two small scale gold miners are alluvial where gold mining occurs in hills of sedimentary rocks and at the bottom of hills of Gisakura/Nyamasheke and Nyamiyaga/Gicumbi concessions respectively (***Photo 2.2***).

At the mining concessions of Gisakura/Nyamasheke, the alluvial gold is extracted by use of excavators which helps in demolishing the mounds of sedimentary rocks and then miners use shovels to extract the gravel while big sedimentary rocks (conglomerates) are displaced manually or using excavators.

In the concessions of Nyamiyaga (Gicumbi district), gold is found below a clay layer (***Photo 2.3)***, which makes the use of machinery more complicated. Therefore, because of the nature of the area of Nyamiyaga, mining process does not involve any machinery except the sluice step which uses a machine that was bought for that purpose. The extraction is done manually using shovels and the extraction is done on the site.

Processing:

For both alluvial deposits, gold is subsequently concentrated by gravimetrical processes, including sluice boxes and panning. In both sites, gold occurs in a free form as nuggets, flakes or gold sands. There are no crushing and milling activities for alluvial deposits.

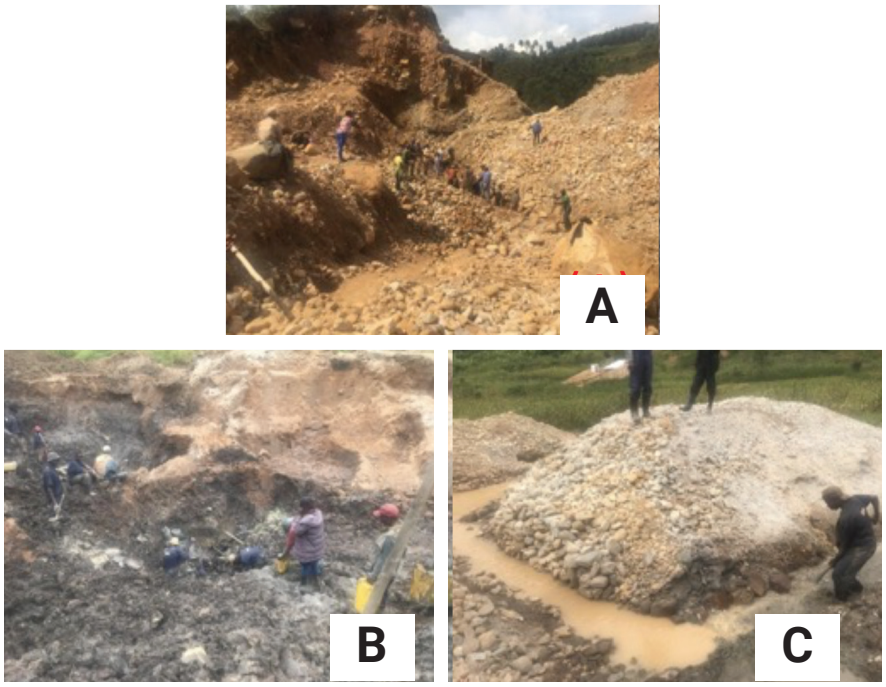


Photo 2.2 (A) Sedimentary rocks hills, Nyamasheke, (B) alluvial gold, Nyamiyaga/Gicumbi, (C) sluicing of alluvial gold, Nyamiyaga



Photo 2.3 Typical tunnels of mining concession, Nyamiyaga

2.7.2 Hard Rock Mining

Hard rock mining was encountered in most (62.5%) of the 8 visited concessions such as in Miyove where gold is hosted by quartz veins in primary gold deposits. As indicated previously, the region counts around 72 tunnels which are managed by Ngali Ltd. Those tunnels are lit up by electricity and have gates that limit the access for people who are not directly involved in mining. In addition, along the tunnels; walls and roof of the tunnels are protected by timbers of big size in order to minimize the probability of occurrence of the accident.

In those concessions, ore is extracted with the use of jackhammers. From underground to the surface the ore is transported either using wheelbarrows or shafts. Transportation of the ore from the mining site to the processing site is done either manually using wheelbarrows and on shoulders in sacs or loaded to pickup trucks and transported to the processing sites. Subsequently, the ore is subjected to wet grinding using a milling machine with balls (Photo 2.4A). The milling is conducted at processing unit that was established for that purpose.

Finally, the milled ore is concentrated through a zig-zag sluice (Photo 2.4B). This was achieved by creating a drop between the first and second platform that disrupts the velocity of the water as it travels down the sluices which are covered by the carpets.

Carpets are then removed and washed in a bucket to remove the captured dense material including gold (Photo 2.4C). Those dense materials are then subjected consecutively to panning and to drying process before being finally purified using a magnet to remove magnetic minerals such as magnetite from concentrate.

To insure, the availability of water at the gold processing unit, a water pond (Photo 2.5A) was established, and the bottom was covered by compacted clay in order to reduce the water infiltration. This helped the company not only to reduce the volume of water they consume but also to reduce the impact of their activities in surrounding environment (particularly downstream). The water is pumped using an electric pump from the water pond to the sluices.

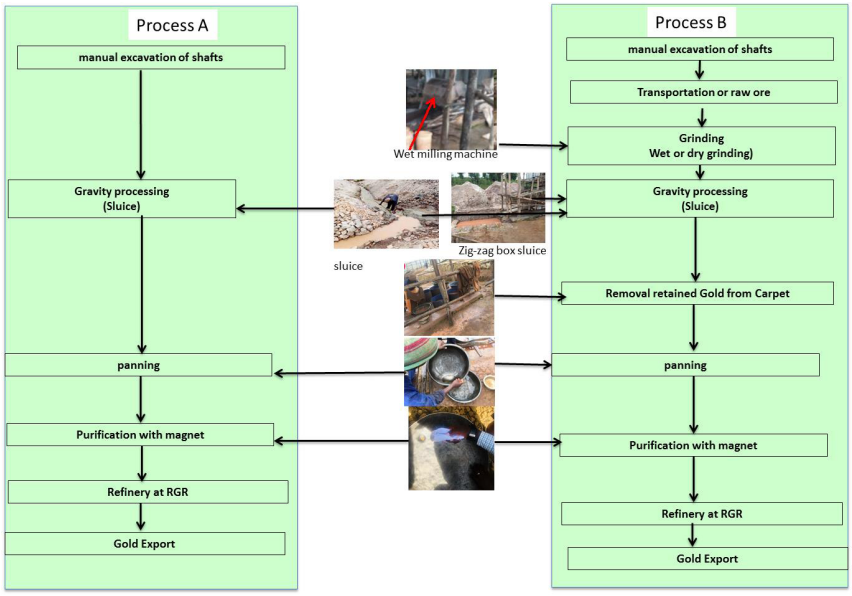


Figure 2.1: **process A: general process applied in alluvial gold mining concessions; process B: general process followed in most of hard rock gold mining concessions except the use of ziz-zag sluices and carpet which are only used in Ngali Mining Ltd.**



Photo 2.4 (A) *Wet ball mill,* ***(B)*** *zig-zag sluice, and* ***(C)*** *removal of dense materials from carpets*



Photo 2.5 (A) Water pond at gold processing unit, and (B) stored tailing from panning and sluicing

It is important to underline that for most of other companies' the process begins with an exploration phase through manual excavation of shafts to depths of approximately 6–10 m until ore bearing veins are encountered. This development phase is typically conducted by miners or the sub-contractor. During this phase, almost all miners are paid daily and are facilitated by the cooperative or company to get different forms of tools, timber, labour, and in few cases, provisions of lunch. Once ore is found through exploration and feasibility studies that include mining, concentrating and purification, it is extracted via digging of horizontal or semi horizontal tunnels that follow hard or weathered veins. The host rocks are broken using hand tools (e.g., pickaxes, spades, metallic motor and pestle) and hauled to the surface using sacks. Ore, low-grade material, and waste rock are manually carried to processing areas. The main reason for transporting low-grade materials and waste rock is to minimise environmental pollution at the mining site as these sites are usually located closer to sensitive environment like wetlands. Heavy minerals at the bottom of the trench are collected and then panned to recover gold pre-concentrate. The pre-concentrate subsequently is transported to the company/ cooperative office where further concentrating with magnet is conducted.

It is important to indicate that, Ngali mining company holds the tailings from sluicing at the processing units (Photo 2.5B) as they plan to acquire in the future advanced technologies that may recover the residual gold as their current process is less effective. This inefficiency gold recovery is known by the companies /cooperative managers and governmental officials.

2.8. Gold trade chain

Gold mined and processed from all mentioned mining concession is in the form of gold-rich sand. This final product is taken directly to the Rwandan Gold Refinery (GGR) facility, for refining to 99.9% purity which started to operate in 2019. After refining, GGR pays the mining companies based on mass of the purified gold and the current price according to London Bullion Market Association(LBMA) where the 1 kg of refined Gold cost around 65,000USD. Apart from the mined Gold, GGR also buys unrefined Gold from some African countries and then export it after refinery.

From 2014, the exports of gold in Rwanda have been almost constant until 2018 (Table 2.5). However as seen in the table below, considerable increase were observed in 2019 and 2020 according to the data of National institute of statistics of Rwanda (NISR). The table below shows the country exports from 2014 to 202039.

Table 2.5 *Gold production*

Commodity (data)	Annual production						
	2014	2015	2016	2017	2018	2019	2020
Gold (kg) (NISR, USGS)	160	319	336	300	300	5,898	11,532

This period follows the period where the Gasabo Gold Refinery started as well as the period where many reforms in mining sector have been introduced including the obligation of each mining company to hire mining engineers, environmental engineers, geologist and mineral processing engineers. It is also in the same period that RMB has created the post of mining inspectors at district level. It is important to mention that the facility buys unprocessed gold from different African countries and exports it after refinery. The

2.9. Baseline estimates of mercury use in ASGM

The field observations and interview with miners, sites managers, owners of companies as well as RMB staff, have not pointed out the use of mercury or any chemicals at mining sites under review in Rwanda. In addition, apart from miners who operated in Uganda in the past years, others were not even aware of the potential role of mercury in gold extraction or what mercury is. The declared non-use of mercury by miners who were aware of mercury could be linked to unavailability of the mercury or other factors that were not explored during the survey.

Although, GGR facility is not part of ASGM, the unprocessed gold imported from some of African countries may contain residues of mercury from ASGM. If this is the case, the awareness of the use of mercury in gold recovery by mining companies should trigger the introduction of mercury in Rwandan mining sector. Therefore, there is an urgent need of establishing a law prohibiting the use of mercury in mining sector in Rwanda.

39 NISR (2021) Rwanda Statistical Yearbook 2021, December 2021. National Institute of Statistics of Rwanda

2.10. Mercury supply, trade and demand

To the best of knowledge based on literature review and to visited institutions, there are no reports or evidence associated with mercury supply or trade to Rwanda.

2.11. Impacts on local development

Gold mining activities have been increasingly contributing towards the country's development in general, and local level development of the areas where gold mining is being conducted. Mining companies contribute to the development of public assets or to the improvement of livelihoods in some families. For example, all visited companies mentioned that they participated in the community work (Muganda), contribute to community health insurance by paying the required fees for poor families who are not able to pay themselves, participate in school construction, construction of public offices like sector, cell or village offices, supported poor families during COVID-19 pandemic.Such contributions are in tandem with the mandatory social investment that the proponents of an economic activity are expected to fulfil. However, the extend of fulfilment or level of satisfaction of surrounding communities were not assessed in the current study and would be important in future studies.

Another contribution that was found in almost all concessions is the contribution of mining companies in the establishment or rehabilitation of roads. Generally, new roads are designed to connect the mining areas and the main roads. In most of the cases, mining is conducted in inaccessible remote areas, sometimes with special topographic conditions such as slopes and soil. The same roads are used by local community and facilitate not only the geographical mobility but also their own business. The companies are also sources of social capital. Salaries from mining activities are used by miners to run different cooperatives and businesses in their villages. Most miners said that the salaries have allowed them to create small businesses that are run by their wives in their respective villages. The extent of new entrepreneurship directly linked to earnings from mining activities was however not exploited in the current study and would also be recommended in future studies.

ASGM also enables miners to pay for school fees, medical insurance, family food, clothes and domestic animals (e.g. goats, pigs, cows, chickens). For men, ASGM is seen as their main source of financial incomes that help them to meet the family demands like payment of health insurance; school fees; agricultures

activities and related small businesses. In addition, working in mining concessions improves their social status when compared with other members of their community. Some miners indicated that they managed to construct houses of their families because of mining. Another interesting aspect is that miners feel respected and important to the country as they contribute to a significant economic sector of Rwanda.

In addition, business centers around the mining areas have benefited from mining activities as results of purchasing power growth in the community because of salaries of miners. For example, a new and rapidly growing business center around one concession of Miyove called Karenda center was observed. This center has restaurants and many new shops that are used by miners. The center is also the site where miners meet vendors (who are largely women) selling ready to eat products like cooked maize, avocadoes and flour-processed products.

Unlike in other countries where mining leads to inflation, the prices of different articles in mining regions are the same as in other regions.

2.12. Environmental impacts

Mining companies are requested by the mining law to take care of the environment they operate in and must deposit the environment guaranty which is refunded after correctly rehabilitating the damaged environment during mining processes. The companies at the end receive a certificate that confirms that they have complied with the requirements. This obligation of the law motivates the mining companies to do their best to mitigate the environmental impacts from mining activities.

Destruction of Landscapes

Despite the obligation of the law and the commitment of mining companies, in visited areas where alluvial gold mining is taking place, destruction of landscapes is one of the notable environmental impacts creating waste rock piles and open pits. Luckily some of the waste rock has found some use in construction and landscaping (***Photo 2.6 A and B***). The by-products such as rocks, sands and gravels are used by the surrounding community for different types of construction. In other cases, the waste rock is abandoned near streams (Photo 2.6 C). Alluvial gold mining increases the turbidity of water and results in siltation of rivers.



Photo 2.6 *Alluvial mining waste-rock:* ***(A)*** *used for construction, Gisakura/Nyamasheke* ***(B)*** *used for garden decoration* ***(C)*** *abandoned near stream, Nyamiyaga/ Gicumbi*

Water Pollution

Rivers found at gold mining sites pass through many regions where they provide a wide range of services including irrigation and other ecological services. In Nyamiyaga/ Gicumbi concession, the river of the wetland is always turbid because of sediments from the mining activities. The treatment systems made of three retentions ponds in series that was put in place is not very effective and needs to be improved to slowdown the velocity but also to retain sediments. The water from this concession as it is now is not appropriate for irrigation and may not be favorable for some organisms that need light and oxygen for the survival. Furthermore, stagnant water in the wetland can be a shelter and breeding ground for mosquitoes.

For Miyove concession, which has many tunnels upstream of Rugezi wetland, considerable efforts for the wetland protection have been put in place. These include the installation of rainwater harvesting systems (water tank, percolation pit) on different houses at the different sites, fencing the soil excavated from tunnels with a series of spaced bands of rocks, and the entire system is fenced with iron sheets to stop any flow of the sediments towards the wetland. At this concession, there is also a risk of water contamination by acid generated from newly exposed sulphide minerals like pyrite in rocks from tunnels, a contamination that is known as "acid rock drainage." It is important to recall that Rugezi wetland is one of the Ramsar sites that provides a wide range of activities including the provision of water to Burera and Ruhondo lakes, which further provides water to two hydro-powers that supply electricity to a large part of Rwanda. Furthermore, it is known that the persistence of heavy metal contaminants in soil and sediments is higher than in other environmental media,

and trace metal pollution from gold mining appears to be nearly unavoidable. Therefore, accumulated metals in excavated soil or tailings are gradually introduced in water resources by leaching.

One of the main environmental concerns at the COMIKAGI sites relates to inadequate management of tailings (waste from processing), potentially creating siltation issues in downstream streams and rivers. During processing, most of the ore drains haphazardly from the multiple trenches spanning the hillsides of processing areas into sometimes marshy valley bottoms. Another important environmental concern relates to land degradation associated with operating and abandoned extraction sites and the multiple trenches and small water impoundments found across area hillsides. This impacts residents by reducing land available for farming, while the visibly numerous open and un-fenced shafts and pits scattered across the area can pose hazards for livestock and humans.

Deforestation and protected areas

In Gisakura hills that were covered by natural vegetation and forest are being demolished in order to access the gold.

2.13. Access to health care, sanitation & clean water

In all mining concessions, miners are covered by compensation insurance plan of the company which covers an accident that may occur during the work[40].

Occupational health and safety (OHS) hazards and risks in ASGM are associated with specific jobs, tasks, and functions at the mine. The primary OHS issues observed relate to risks of collapse of under ground tunnels and shafts, repeated stress on musculoskeletal systems associated with carrying heavy loads (e.g. 50–70 kg bags of ore) and repeated motion in awkward positions (e.g., during sluicing), respiratory illness (kaolinosis). These issues are often exacerbated by the inadequate use of personal protective equipment (PPE) by miners. The recommended PPEs include : Boots, dust mask, gloves, salopet, helmet with a lamp and are provided by the mining companies[41].

40 MIFOTRA, 2019 . Regulation on occupational safety and health in mining and quarrying

41 MIFOTRA, 2019 . Regulation on occupational safety and health in mining and quarrying

The Rwanda health care system is organized in the following hierarchy: (1) referral hospitals (that operate national level/ provincial level), (2) district hospitals (operating at district level), (3) health centers (operating at sector level; with most sectors having more than one), (4) health post (cell level), and (5) community health care workers (local people operating at village level) (CHWs)[42].

CHWs have been instrumental in treatment of deadly diseases such as malaria, pneumonia, diarrhoea, community-based provision of contraceptives, DOT for TB, prevention of NCDs, and preventive and behavior change activities. With those responsibilities, CHWs have significantly contributed to the observed improved health outcomes in Rwanda. Those CHWs are available in each village of the country and also support miners in case they have a disease that falls under their mandate. For cases that are out of their competence, they liaise with health centers or health posts. Apart from the service of CHWs, each mining sites is requested to possess a first aid kit to assist in cases of injury. The common components of the kits are: normal saline, anti-inflammatory (ibuprofen, paracetamol, aspirin), anti-acid, kidney dish, pair of scissors, sterile plasters strips, gauze sponges, gloves, month apparatus, alcohol prep pad, bandages, ice pack, adhesive taps, triangular bandage, emergency blanket, abdominal combine pad, rayon ball tourniquet and antibiotics that prevent and fight infection in cuts, wounds and burns). However, only senior staff have limited knowledge about their use which is only based on their personal knowledge and experience. In addition, each miner is requested to own a medical insurance as indicated in regulations on occupational, safety and health established by the ministry of labour (MIFOTRA).

The interaction with different stakeholders including the mining related stakeholders, local administration and health care professionals has indicated the following diseases among miners: severe and lengthy cough in Nyamiyaga miners, pneumoconiosis (in the past years) in Miyove which might be caused by inhaling fine particles from the large amounts of dust generated by mining activities such as blasting and drilling. For this latter disease, two cases of pneumoconiosis were mentioned by the administrative managers in Miyove mining sites in the past two years.

However, in the past, the screening of tuberculosis (TB) among miners in Gisakura/ Nyamashe was carried out because one of the miners had tested positive by the health center, subsequently identifying a large number of miners

42 MoH (2019), Fourth health sector strategic plan(2019-2024) available http://npngti.com/wp-content/uploads/2018/06/Rwanda_Nat-Health-Sector-Plan_2018-2024.pdfat:

with TB. Up to now there is not any TB screening research that was conducted among miners. Therefore, it would be brutal to expend this to all mining site. Note that the medications for TB are free of charge for anyone who tested positive and are taken under the observation of a healthcare professional or CHWs to avoid the resistance of TB to the treatment. Other diseases that were reported in the area of the mining sites include malaria, diarrhoea, flu, HIV AIDs, sexually transmitted infections (particularly gonorrhoea) and all can be managed by the nearest health center. Although those diseases were reported in the mining regions, healthcare professionals never noticed any special trend of those diseases in those regions.

Health centers that serve people from mining region possess qualified staff according to the health sector organization in Rwanda. For cases that are out of their capacity or that need specific specialization, health centres referrer the patient to the district hospital which referrers to the referral hospitals as indicate above.

In all those facilities(health centers), health care professionals were not aware of the toxicity of mercury and its potential role in gold mining. In addition, for all health centers, the isuue of a small number of the health care providers compared to the number of patients they receive was reported. In addition, they don't possess facilities that can allow them to analyse mercury in any biological sample.

Like the healthcare professionals, OSH also are not aware of the effects of mercury in ASGM and could not provide relevant relationship between certain health problem observed in mining community with occupational health risks and therefore, trainings are urgently needed for OSH inspectors.

All workers are required to be enrolled in social health insurance programme called Mutuelle de Sante, often paid by sub-contractors on their behalf, then deducted from wages43.

43 MIFOTRA, 2019 . Regulation on occupational safety and health in mining and quarrying

Sanitation and access to clean water



Photo 2.7 Latrine used by miners, Nyamasheke District

he survey revealed that access to public water supply system is a challenge at 92% of the gold mining sites. The miners were using either water from the neighboring spring or they bring their own water from home. The number of ablution facilities was also not adequate. ***Photo 2.7*** shows a toilet in one concession that is used by both men and women miners.

Such toilets are a major problem as it can led to hygiene and waterborne related diseases such as diarrhea. Interestingly all mining concessions have a specific ablution facility assigned to women miners. Such room serves to women for any physiological health related need and for clothes change when they come or they leave work place.

Safety of miners

According to their data and field observation, few of their tunnels are protected (Table 2.3). However, even those that are said to be protected do not meet the required standards, as most of them possess one entry. This is not providing option to miners of escaping through other tunnels in case one collapses. In addition, the ventilation is not adequate.

2.14. Formalization and access to financial and technical assistance

The on-going process of formalization of the mining sectors is led by the RMB. Mining is a recognised key sector of the national economy in the National Strategy for Transformation (NST1, 2017-2024). More than 50% of companies have shareholders who were mining in different concessions or in their field before the process of formalization starts. For example, in Miyove concessions where people were mining on their own or in their fields are now working as subcontractors of Ngali limited who provide to them both technical and financial support. Similarly, in Nyamasheke concession also owned by Ngali Ltd which gave priority to people who were mining in the area before.

The extensive formalisation of the ASGM sector would support the gold value chain since Rwanda now has a gold refinery, in addition to the smelter for tin and recently approved diamond cutting and polishing centre. The elements that have been driving the formalisation of the ASGM sector include some legal reforms such as criminalisation of mining operations not complying with the RMB licencing system.

There are documented cases of illegal gold miners that were caught by the local authorities and the information is made public in order to discourage similar activities. Miners with operating licenses can also lose their licenses, if they fail to comply with the provisions within their operating licence.

In respect to the practices, it is now an obligation for mining companies to employ qualified mining staff, including a mine manager, professionals in charge of mining engineering, mineral processing, environmental management, health and safety and community relations. All those staff are now being trained by the local higher learning institutions and companies have started to benefit from their expertise. For example, the school of mining of the university of Rwanda (UR) which started in 2015 (two year before the establishment of RMB) has the Geology departments and the department of mining engineering. On the other hand, the mining department of IPRC has a curriculum that covers the following aspects:

- The fundamental concepts, principles and theories of Mining Engineering.
- Mine plans and designs,
- Mining Methods,
- Geology Specifications and its types
- Environmental aspects, mine safety, mine legislations,
- Installation of Ventilation and Environmental Engineering
- Mining Machineries, Materials handling equipment, maintenance and repairs and its optimum usage and mine assets management
- Surveying and its applications in Mining engineering
- Basic computing skills, English and communication skills, Applied Mathematics, Basic Sciences and Engineering sciences relevant to Mining engineering

- Geo-technics, rock breakage and use of blasting technology
- Mineral economics, entrepreneurship and management techniques relevant to Mining Engineering.
- Mineral beneficiation principles

This department has already graduated more then 362 experts.

In all districts, the technical staff(of different mining companies) are being supervised by mining inspectors who are staff of RMB. Those inspectors do regular inspections at mines, and this is already improving the management and productivity of the mining activities around the country as witnessed by mining companies and local leaders. Besides controlling the mining practices, the RMB staff provide the technical advice to the mining companies and play also a key role of issuing the Rwanda Mineral Export Certificate to fight against illegal exploitation of gold and ensure proper reporting, demand due diligence, and transparency.

To ensure the environment compliance, the licensee pays the financial guaranty to the National Fund for Environment in Rwanda 'FONERWA'. The guaranty is refunded when the holder of the licence completes the closing of the mine and after the competent authority approves successful completion of the rehabilitation works. Despite this requirement, according to REMA and other stakeholders, a limited number of companies make a follow up of the financial guaranty which is a gap that should be addressed as far as the environment rehabilitation is concerned.

For the capacity building, in the past years through RMB, GIZ have been providing direct technical support to the German National Research Centre for Information Technology in Rwanda, including through training of government officers related to mine inspection and provision of direct facilitation to aid them in fulfilling their traceability mandates. They provided technical support for mine standards, mine planning, and improvements needed to advance artisanal miners to the small-scale status. Through this new direction, Rwanda mining law does not recognise either artisanal or illegal mining as its scope starts with small scale mining. However, there are still efforts to be done by a good number of Rwandan companies in order to be seen as larger scale mining companies.

Despites those initiatives and steps made so far, the country still lacks the experts particularly in exploration, scientific equipment, and technical expertise, among others. In addition, miners expressed the difficulties of accessing to bank credits as bank managers do not understand the sustainability of the mining projects.

In fact, during consultations, mine operators stated that access to financing is a challenge that affects both large and small-scale operations. This issue is due to lack of adequate collateral to secure the credit facilities, there is also limited knowledge of the extractive industry and mining operations among bank staff. Creditors are generally reluctant to provide project financing funds for projects with which they are not experienced or are uncertain of the risks regarding loan repayment. The exploration reports required by ASM and LSM operations are insufficient to provide assurance to lenders that the resources being mined will continue to produce steady income for the duration of the loan. In addition, fluctuating incomes among mining companies and cooperatives add to the negative perception among bankers about capacities to meet the minimum repayments; in periods of low production, companies tend to experience a reduction in seasonal workers, who venture out to earn income in different sectors. Finally, the current limited levels of exploration, reserves, mine plans and the support of technicians make it difficult to present bankable plans for financing expansion of existing mining operation.

3. RWANDA'S VISION FOR THE ASGM SECTOR

The Republic of Rwanda's vision for developing the mining sector and specifically the ASGM sector is enshrined in the National Strategy for Transformation 2017–2024 (NST1) (RoR, 2017)[44]. The target is to "upscale mining by completing exploration of potential mineral areas to establish the extent of national resources and reserves, in terms of quantity and quality with the aim of exporting USD 800 million by 2020 and USD 1.5 billion annually by 2024, from USD 373 million in 2017". To meet this target the Government of Rwanda has focused on "professionalizing the artisanal mining sector through training, financing and equipment". A high average growth rate of 13.0% per year from industry was projected during the NST1 period. The growth would be mainly attributed to large improvements in mining (to achieve 23.0% average growth per year from 2017 to 2024) and increases in construction (RoR, 2017)[45].

The government of Rwanda, through RMB is committed to provide the detailed exploration works, including drilling in order to determine and characterize mineral resources in the country. The country is determined to establish gemstones cutting, polishing, and a trading hub in Rwanda to act as a centre for processing and trading as well as a laboratory for testing precious stones is underway. Rwanda has a state-of-the-art gold refinery, a tin smelter and recently has provided the trade license of diamond and has recently established a mineral quality control laboratory which is currently working hard to get the accreditation.

Among other projects underway from the RMB include the establishment of geological and mineral information management system and continued promotion of investment in mining by attracting strategic investors using adequate data as being generated through exploration programmes in the framework to professionalize the mining sector. Gazetted in 2018, the mining law, Law N° 58/2018 of 13/08/2018, seeks to deal with some of the major challenges in the mining sector such as poor mining practices and illegal mining which remain

44 RoR (2017) 7 Years Government Programme: National Strategy for Transformation (NST1) 2017–202. Republic of Rwanda, Kigali. https://www.nirda.gov.rw/uploads/tx_dce/National_Strategy_For_Trsansformation_-NST1-min.pdf

45 RoR (2017) 7 Years Government Programme: National Strategy for Transformation (NST1) 2017–202. Republic of Rwanda, Kigali. https://www.nirda.gov.rw/uploads/tx_dce/National_Strategy_For_Trsansformation_-NST1-min.pdf

the main cause of mining accidents, promote best practices in the mining sector, and promote improved partnerships among all stakeholders in the mining sector. The law also tackles a wide range of other issues in the mining sector, including the safety of the communities that surround mines and stipulated penalties on mining companies or individuals operating illegally. Other provisions of the Mining and Quarry Operations law are given in Section 2.5, and include the obligation to carry out environmental and social impact assessment (ESIA) before commencing mining or quarry operations.

3.1. Domestication of regional frameworks

As an African country, Rwanda is a member of the Africa Mining Vision (AMV) which was formally established in 2009 by the African Union (AU), to promote equitable, broad-based development through the prudent utilization of the continent's natural wealth (AU, 2009)[46]. While the AMV recognizes the contribution of artisanal and small-scale mining (ASM) to local economic development, Rwanda mining law does not define the artisanal mining.

Rwanda is a signatory of East African Community (EAC) Protocol on Environment. The protocol has relevant provisions for environmental and social management for the project.

One article of the protocol urges Partner States to develop national laws and regulations requiring project proponents to undertake ESIAs and review of ESIA reports to be done by all the Partner States if the potential impacts are likely to be trans-boundary. The same to apply for Environmental Audits in Partner states should ensure control of pollution from non-point sources through legal economic and social measures[47]. Rwanda has also ratified the East African Community Customs Management Act, No.1 of 2005.

3.2 Main issues in Rwanda ASGM that needs to be addressed

Analysis of the findings revealed a number of issues that needs to be addressed by NAP.

Those include:

46 African Union(2009), Africa mining Vision available at: https://docs.igihe.com/IMG/pdf/africa_mining_vision_english.pdf

47 https://www.eac.int/environment

- Low awareness of mercury use in ASGM as well as related problems by different actors and stakeholders (miners, local leaders and healthcare professionals) involved in mining sector,
- Rwanda does not have a law, or a regulation prohibiting the import or use of mercury as element,
- Low knowledge of high gold recovery techniques free of mercury,
- Weak implementation of environment rehabilitation and tailings management despite the payment of environmental rehabilitation guaranty by mining companies,
- Mining health related diseases reported by both local leaders, healthcare professionals and miners,
- Low access to finance, credits, materials, equipment by mining companies,
- Lack of accurate exploration data that result in resources loss by miners as they sometimes do exploration themselves,
- Lack of harmonization of mercury trade within the region,
- Inadequate mining practices that led to the environmental damages or fatal accident as well as low gold recovery

4. NATIONAL GOALS AND OBJECTIVES

4.1. National Goals

The protection of human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds through the sustenance and enhancement of mercury-free ASGM practices is the overall goal for Rwanda, stemming from the production of the NAP. The practices described in this NAP report will mainly focus on: (a) promotion of continued use of mercury-free technologies and adoption of innovations to increase efficiency and improve gold recovery at minimum environmental costs (b) enhancing occupational and public health protection within and around ASGM communities, (c) promotion of good labour practices, working conditions and equitable distribution of profits from ASGM activities, and (d) legal reforms, as informed by the findings of the baseline survey and stakeholder consultations.

The sub-goals set:

1. Effectively maintain a non-mercury ASGM sector;

2. Develop and promote improved mercury-free and more effective gold recovery and improved processing efficiency

3. Develop and implement coherent national policies, regulations and practices that promote the environmental sustainability of ASGM, as well as safety measures to protect miners and communities by 2025

4. Foster good labour practices, working conditions and equitable distribution of profits among the ASGM players, their communities and allied sectors

4.2. NAP Objectives Actions and Targets

In line with the national goals, the following objectives, actions and targets were set to support the effective implementation of the NAP (***Table 4.1***).

Table 4.1 *NAP objectives, actions and targets*

OBJECTIVE 1 To effectively maintain a non-mercury ASGM Sector during the period from 2022 to 2025, and beyond	
Problem statement: Baseline study and stakeholder consultations revealed that there is no gold processing in Rwanda that uses mercury amalgamation methods. Thus, there is no intentional mercury release to society from gold mining. Many of the ASGM players encountered were not aware of the role mercury could play in gold extraction; however, some miners proved to have experience in mercury use in ASGM in neighbouring countries, particularly Uganda and Tanzania. During gold processing using non-mercury technologies, some processors expressed that they are keeping the tailings for potential future processing as they perceive that the methods they are currently using could be leaving a considerable amount of gold in the tailings. Stakeholders in Rwanda should keep in mind that mercury use in Rwanda's ASGM may be considered an option in future since mercury is currently legal.	
Actions	**Target**
1. Increase capacities of the regulatory authorities (REMA) and government boards (Rwanda Mining Board) to efficiently conduct regular inspections at mining premises to ensure that: (a) miners continue to use mercury-free methods of gold processing, (b) an inventory of gold mining and processing methods are well documented, (c) gold production is well documented at all mining sites.	RMB inspectors (20) and REMA officers (10) received training on investigating mercury use in gold processing and promoting mercury-free gold technologies by 2023.
2. 1.2 Raise awareness on mercury hazards among the gold miners, processors, concession owners and surrounding communities on the potential risks associated with the current practices and the activities they can undertake to safeguard their health and safety	At least 1awareness campaign held in each gold mining and processing District per year by 2025

3. Integrate information management systems for ASGM activities to improve information sharing among miners and related stakeholders	A functional mining information management is established and accessed by users by 2025
4. Identify and domesticate environmentally friendly technologies and best available techniques to recover residual gold in tailings of old workings	At least 2 tested Mercury-free technologies developed/adopted to recover gold from tailings by 2024; At least 20% of miners/processors using the Mercury-free technologies by 2025;
OBJECTIVE 2 Adoption and promote improved mercury-free and more effective gold processing technologies by 2025	
Problem statement: With the rapid changes in the gold industry in which gold production increased by 95% between 2019 and 2020, there is need to strengthen technological interventions that ensure existing extraction methods continue to be competitive and far outweighing methods involving mercury use. The case of Rwanda gold industry should be maintained as a good example to transform the gold mining communities in the region that perceive that there is no cheaper alternative to mercury use during gold recovery than mercury amalgamation. Within the past decade, the Government of Rwanda has been promoting capacity to adopt modern mining technologies and moving away from artisanal mining through the establishment of the School of Mining and Geology at the University of Rwanda and the Department of Mining Technology at the Integrated Polytechnic Regional College (IPRC). A deliberate effort to promote heritage-based research and innovations that can continue to support the local ASGM sector to have more confidence in the mercury-free gold processing technologies that they are using can prevent future diversion of mercury to the sector.	

2.1 Mobilise resources for research into improved mercury-free technologies to process gold	At least 5 proposals developed for funding on mercury free technologies by 2023; At least 3 proposals funded by 2025
2.2 Lobby for academic and research institutions to research and come up with new innovations to enhance the sustainable development contributions from gold mining sector while ensuring higher gold recovery efficiency during processing	At least 2 innovations with high recovery efficiency established and demonstrated by 2024; at least 10% of ASGM players using improved technologies by 2025

OBJECTIVE 3 Develop and implement coherent national policies, regulations and practices that promote the environmental sustainability of ASGM, as well as safety measures to protect miners and communities by 2025

Problem statement: Under the provisions of Article 7 of the Convention the country will be expected to: (1) provide a review every three years of the progress made in meeting its obligations within the ASGM sector, (2) include progress reviews in its reports submitted pursuant to Article 21, and (3) cooperating with other parties, relevant intergovernmental organizations and other entities to reduce and where feasible eliminate the use of mercury in ASGM activities. Although the country does not currently have mercury use in its ASGM sector some legal provisions are required to foster sustainable mining, good reporting and cooperation with other countries that are the hotspots of mercury use; The baseline survey revealed that there are many environmental issues that include: (1) water quality deterioration as a results of gold ore processing, (2) land cover change through deforestation, biodiversity loss and soil erosion, (3) absence of mining wastewater treatment facilities, and (4) limited research targeting ASGM. These issues may require some legal reforms, improved inspections and some enforcement. However, experiences from other countries reveal that enforcement of regulations alone does not provide adequate cooperation of ASGM players in resolving the challenges in the sector but a participatory exchange of information. A knowledge sharing platform requires both legal reforms and adequate training of miners, regulatory authorities, other enforcement agencies, civil society and other relevant stakeholders.

Actions/	Target
1. Develop new regulations prohibiting worst practices in mercury handling and usage through review of the existing ones	New regulation on ASGM developed by 2025 on worst practices;
2. 3.2 Strengthen monitoring mechanisms on environmental rehabilitation and mining tailing and burden management.	100% compliance with the provision of the regulation on environmental rehabilitation.
3. Conduct regular inspection and monitoring of soil, water and air quality, and human and animal health around ASGM sites for compliance to mine safety rules and regulations	All ASGM sites to undergo environmental audits for compliance by 2024; Levels of Mercury in water/sediments assessed in all of ASGM sites; At least 2 national studies conducted on mercury levels in fish and plants from ASGM hotspot areas
4. Build capacities of regulatory institutions	All local authorities and other regulatory and administrative authorities in ASGM areas trained on participatory approaches and on enforcement of reviewed laws governing ASGM by 2024
5. Strengthen mercury import control measures at ports of entry, including measures on imported dore for refining that may contain traces of mercury	Linkages (formalised by MoUs and bilateral agreements) between national and international regulatory authorities to curb any potential smuggling of mercury developed by 2024; At least five exchange visits by 2025
6. Establishment of operational networks of stakeholders to support environmentally sustainable ASGM that ensures proper tailing management and adequate rehabilitation	Platform for coordination of ASGM activities set up and functioning by 2023; At least one joint MOU/MOA signed and implemented by 2024
OBJECTIVE 4: Foster good labour practices, working conditions and equitable distribution of profits among the ASGM players, their communities and allied sectors	

Problem statement: The baseline survey and stakeholder consultations revealed that the welfare of miners is not adequately addressed in terms of health insurance, safety, training and remuneration. The gender related barriers to women participation in the ASGM sector were identified to be linked to: (1) women's role in agricultural activities as part of division of labour while their male counterparts are in mining, (2) worry of a mining accident that could kill both of the married couple if they are working at the mines, (3) traditional gender role of women in child care

Action	Target
4.1 Promote mandatory use of PPE and related culture of safety at workplaces among the miners and processors in ASGM	At least 5 awareness campaigns on the safety measures in ASGM conducted by 2025 At least 500 miners trained on use of PPE and related safety practices
4.2 Build capacities of the regulatory authorities on occupational health to include ASGM in their mandate	At least 20 MIFOTRA staff in charge ofmonitoring occupational health and safety inspection trained on workplace health and safety in the ASGM sector
4.3 Promote the concept of minimum wage in ASGM to safeguard exploitation of workers	Minimum wage set for ASGM mine workers annually from 2023
4.4 Strengthen the Rwanda Women in Mining Association to lobby for women's involvement in ASGM and raise awareness of mercury and other environmental hazards	At least one functional subsidiary network of women in mining focused on ASGM established by 2025.

4.3. Overall Schedule of Implementation

The Ministry of Environment, through REMA, will coordinate the implementation of the NAP involving partners from other government institutions, civil society organisations, local community leadership and other relevant stakeholders. A multi-sector platform coordinated by the National Steering Committee will oversee the implementation process within a period of 3 years (2023- 2025). Four project implementation sub-units will be established to cover the four identified objectives and the lead from each unit will report to

the National Steering Committee that will in turn report to REMA Directorate. Specific terms of reference will be given to each unit in line with the expected target, and the Steering Committee will ensure coordination of activities and sharing of information among the units.

The multi-sector platform will comprise of members from: Ministry of Health; Ministry of Infrastructure; Ministry of Finance and Economic Planning; Ministry of Lands and Forestry; National Institute of Statistics for Rwanda; Ministry of ICT and Innovation; Ministry of Justice; Ministry of Trade and Industry; Ministry of Local Government; Ministry of Education; Ministry of Public Service and Labour; Civil Society Organisations; relevant parastatals aligned to state Ministries; Mining Companies and Cooperatives; Rwanda Mining Association; Rwanda Media and communication groups; Local community leaders; and development partners. The specific role of these institutions are given later in Section 5.1.4.

5. IMPLEMENTATION STRATEGIES

The ASGM sector in Rwanda does not use mercury or any other chemical. However, Rwanda has a gold refinery facility that imports the unrefined gold from different countries of Africa which may have used mercury during the extraction process. Therefore, some of the strategies related to mercury remain relevant in addition to deviations from good mining practices or weaknesses identified during the ASGM national overview research.

The stragies propose to take a precautionary approach to address potential emergence of any of the worst practices (including mercury use) and proposes the action that could help in upgrading the current practices.

5.1. Strategies

As required under Annex C of the Minamata Convention, this Section presents the strategies that are linked to the national objectives and propose actions presented in Section 4.2. The linkages are provided by the action number. The strategies were largely adapted from those proposed by Minamata Convention and relates with Rwanda's national objectives and targets (Section 4.2).

5.1.1. Prevention of the worst practices

The research indicates that Rwanda does not currently have ASGM activities using of mercury, and there are therefore no known case of the worst mecury management practices, such as: (1) open burning of amalgam, (2) cyanidation of mercury rich tailings, (3) whole ore amalgamation, and (4) burning of amalgam in residential areas (see Annex C paragraph 1 of the Minamata Convention). However the NAP proposes to take a precautionary approach to address the potential emergence of any of these practices by: Develop and Broadcast training videos of the better mining practices and new technologies that have replaced any need for mercury (Action 1.1); Promote the design and adoption of technologies with a higher gold recovery without mercury use or any other harmful chemical by miners (Action 1.2); promote use of PPEs among miners(action 1.3); Raise the awareness of miners on the non-use of mercury and other chemicals as well as proper tailings management in the mining laws, regulation and policy (Action 1.5), Train miners on watershed management practices to

boost their skills on mine closure and rehabilitation (Action 1.4*)* improving education and awareness on the dangers of the worst practices (Action, 1.2); and (d) ensure regular monitoring of ASGM sites (Action 1.6).

To ensure a positive growth of ASGM mining sector, RMB in collaboration with RMA should develop videos of effective technologies without relying on mercury. Those videos will be shared with miners, who will finally adopt those that are applicable to Rwanda context (Action 1.1) through the formalization process detailed in strategy 5.1.2.

This should run concurrently with the update of the existing regulations (Action 1.5) as well as mobilisation of financial resources (soft factors) to ensure the uptake of good practices.

The proposed review of the existing legal framework will ensure that the worst practices prohibited are not used in Rwanda. In additional, it will cover other issues related to gold mining in Rwanda such as the environmental damages, water pollution and poor tailings management which are seen as potential sources of heavy metaland sediments in rivers.

This is very important as most of mining concessions were reported by stakeholders to have many issues related to inappropriate rehabilitation.

The training on integrated watershed management and rehabilitation plant species selection was also found to be required as indicated by different managers (Action 1.4).

In addition, a series of sensitization/awareness meetings on the dangers of the worst practices will be held in concession area, district and national levels to address each form of worst practice. Those activities should be conducted on the last Sunday of the month in meetings that take place in all villages and cells after the monthly community work (Umuganda). Such activity will be conducted by RMB inspectors in collaboration with local leaders (from village to the district), environmentalist of the area (agronomist of the sector, district environmentalist).

Those sensitization/awareness meetings should be facilitated with well-designed poster or video preferably in both English and the local language, Kinyarwanda at a technical level that is accessible (understandable) to everyone.

Furthermore, RMB inspectors should continue to monitor the adoption and optimisation of new technologies as well as the compliance with the updated regulations (action 1.5). Institutions that will be involved in these activities include the departments and government agencies from the Ministry of Environment MoE), Ministry of Health (MoH), Ministry of Infrastructure (MININFRA), Ministry of Finance and Economic Planning (MINECOFIN), Ministry of Education (MINEDUC) and Ministry of Justice (MINIJUST), organizations representing the ASGM players, including the Rwanda Mining Association (RMA) and Rwanda Women in Mining Association, as well as local leadership.

5.1.2. Strengthening the ongoing ASGM formalization process

The formalization of the ASGM sector has been driven mainly by MoE through RMB. However, there is still a long way to go in order to achieve a professional mining which does not include the artisanal scale practice (as indicated in the mining law) and its all-associated problems.

Formalization is a multidimensional process, containing many components, ranging from allocating land and facilitating miners' organizations to providing access to finance and enforcing regulations (Figure 5.1)48. It insures that (1) ASM actors (e.g., miners and traders) possess the necessary licenses and permits, and RMB has been insuring these under three categories (small-, medium- and large-scale), with artisanal gold miners operating largely as registered cooperatives and companies (2) ASM actors are organized in legitimate entities that represent their needs, and the Rwanda Mining Association has been protecting the interest of ASM, although not exclusively in gold mining (3) policies are implemented, monitored and enforced, (4) ASM actors have access to technical, administrative and financial support that empowers them to comply with a number of requirements prescribed by national regulations. However, there are still issues that need to be addressed specifically for the last two steps of the ASGM formalization process. The proposal is to go beyond licensing and address other issues.

48 https://www.igfmining.org/formalizing-artisanal-and-small-scale-mining-for-inclusive-sustainable-development/



Figure 5.1 *Formalization steps of ASGM*

The NAP proposes to facilitate the formalization process through: (1) Develop and implement a plan for stakeholder engagement and participation in the formalization process(action 2.1); (2) Improve knowledge and awareness of mercury flows, so that trade regulations and the organizations charged with enforcing them are better informed(action 2.2), (3) The establishment of a clear plan for transition from artisanal mining scale to medium scale(action 2.3), (4) Review of the institutional capacity required by formalization and identify resources to enhance this capacity (action 2.4); (5) financially and technically capacitating the ASGM companies and cooperatives, and facilitating continuous engagement of stakeholders in accessing to financial, technical and market services, and monitoring and enforcement of regulations (Action 2.5 and 2.7), (6) Perform review policy and regulations and update laws and regulations as necessary to encourage formalization (action 2.7), (8) Conduct and publish the mineral exploration and reserves estimation(action 2.8), (9) Establishment of an Integrate Information Management Systems for ASGM activities(action 2.9).

The first step towards ASGM formalization should consist of developing and implementing a plan for stakeholder engagement and participation in the formalization process (Action 2.1). The activity should be led by RMB and should consider the stakeholders mapped under strategy 5.1.4. In this plan, the role of each stakeholder should be defined and the overall team should have planned meetings for progress monitoring and evaluation. The stakeholders will be also in charge of disseminating to other stakeholders the outcomes from the formalization process (action 2.10).

To speed up the process, a national consultant could be hired to establish the ASGM growth plan using the existing guidelines from the UNITAR/UN Environment (2018) (action 2.3). This activity will be led by RMB and will be conducted through an extensive consultation with key stakeholders as captured in the table below. The outcome should be aligned with the RMB vision and plans.

The consultant should help also in achieving the second activity by reviewing the institutional capacity required by formalization and identify resources to enhance this capacity.

During this review, the consultant should analyze the capacity of the existing mining companies in terms of infrastructure, financial capacity gaps and human resources capacity gaps between their status and the requirements for small scale miners. They should also look at the legal barriers and gaps, and opportunities for future improvements (Action 2.4).

Due to the perceived interconnection between ASGM (in particular, the population providing labour at the mining sites) and life style of miners, the consultant should come with proposition to avoid impacts that could arise during the formalization as non-systematic transition could make the life of miners more difficult.

The approach of formalization should be broadened to include the development of diversified and alternative livelihoods to ASM (artisan training on alternative skills such as carpentry and construction, diversifying income sources and expanding non-mining revenues), which would facilitate ASM transitions from artisanal to small-scale mining; from gold and gemstones to industrial minerals; from mining to farming and other businesses. This will need to be done in direct consultation and with input from the ASM miners. In addition, the alternative livelihood programmes will need to be holistic enough to change the entire socio-economic-environmental conditions at the local level.

To achieve a sustainable development of the sector, initiatives that could facilitate the access to credit, financing and equipment should be established (Action 2.7). Those may include the exemption of mining equipment and machines from taxes, attracting suppliers of mining equipment to run their business in Rwanda, inviting refinery companies to invest in the local market, providing training on company management and business planning to mining companies.

To overcome the problem of resource exploration by the companies, the country via RMB should strive to generate more accurate exploration data by hiring mineral exploration and reserves estimation experts (Action 2.8). This will be benefited by both miners and the country as it will contribute to the increase of mining yield and people can estimate the environmental damages before starting the mining process. The generated data should be availed to the users through an integrated mining information management system.

This system could cover the modern aspects of modern mining industry such as knowledge sharing, safety, environmental impact, process improvement, remote operations, exploration and production techniques, asset management, efficiency and mine automation (Action 2.9). However, before the establishment, the information system of mining industry, there should be a communication platform through which outcomes from the formulization process will be disseminated. Such communication should be coordinated by RMB with continuous collaboration with RMA and other potential stakeholders as listed in the table under the work plan section.

Moreover, improving knowledge and awareness of mercury flows, so that trade regulations and the organizations charged with enforcing them are better informed. Those organizations include RRA, RIB, REMA, MoH and RMB (Action 2.2). A continuous monitoring and evaluation program should be scheduled and be implemented. This process should be led by RMB and should involve the stakeholders from different sectors related to ASGM.

5.1.2.1. Urgent actions that needs to be taken into consideration

The current practices do not meet with the legal status of the mining sector. Each of the major steps involved in mineral extraction and processing has gaps that impacts directly either on the health of miners and those in the communities or environment in general. However, some initiatives that can be extrapolated to other concessions were identified.

a) Grinding

The examination of health conditions of miners revealed a health concern among miners caused by an anarchical grinding of hard minerals using traditional tools, mainly hammers. This is a pneumonia-like disease which is caused by the dust from minerals grinding activities. However, there are concessions applying the wet grinding system using ball milling machine. This practice should be encouraged in all concessions dealing with gold extracted from the hard rock to ensure the safety of miners.

b) Sluicing

As previously described, some ASGM companies conduct the sluicing step within deviated streams, which lead to a high load of sediments downstream. However, others decided to pump water from water bodies to constructed water

retention ponds where water is continuously extracted in order to be used in panning and sluicing step. Used water, is reinjected into the water ponds. This reduces a lot the impact of ASGM on water quality.

Therefore, if this could be implemented in all mining concessions, the impact of ASGM would reduce.

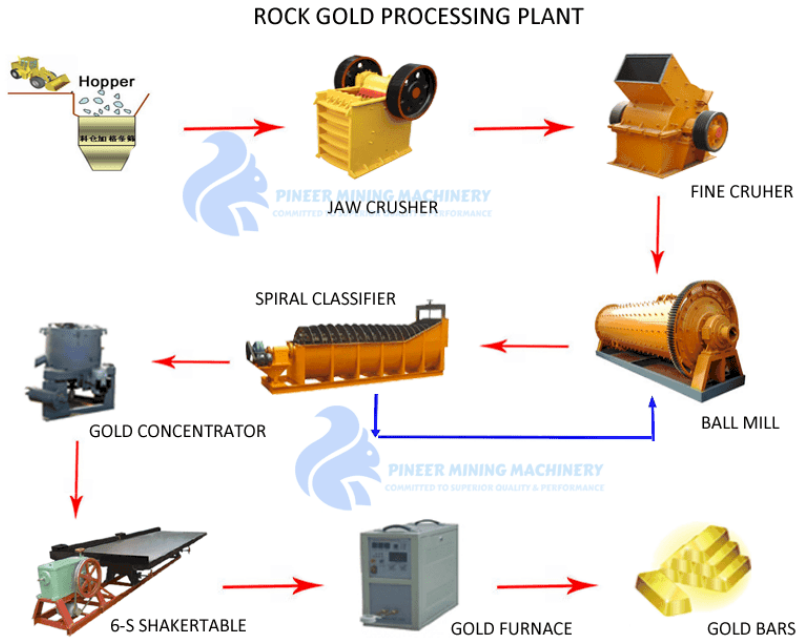


However, sluice boxed should be designed correctly in order to achieve a higher gold recovery. This could be adopted by both miners of alluvial and hard rock gold.

The workflow below illustrates the mechanized gravity gold processing plant which suits the medium scale mining process dealing with hard rock gold.

The gravity gold processing plant mainly including: ore feeder, jaw crusher, fine crusher, ball mill, spiral classifier, gold concentrator/jig machine, shaker table, melting furnace, pumps and diesel generator.

The facilitation of the acquisition of modern equipment/machinery should speed up the transformation of the artisanal mining to the medium mining which is recognised by the Rwandan law



5.1.3. Management of trade and prevention of diversion of mercury

Rwanda does not currently have ASGM activities involving mercury and therefore the NAP proposes to take a precautionary approach. Linkages between national and international regulatory authorities to curb smuggling of mercury will be developed to strengthen mercury import control measures at ports of entry. This will involve the signing of MoUs with international regulatory authorities, the training of personnel, including exchange visits, and exchange of knowledge, experiences and technologies required to manage trade and prevent diversion of mercury and mercury compounds. Operational networks of stakeholders to support environmentally sustainable ASGM will be used to create a platform for coordinating AGSM activities at international level.

UNIDO (2018)[49] provided a regional framework on curbing illicit mercury and gold flows for West Africa and this framework will also be adopted for the East African Region. Recommendations to be adopted from UNIDO (2018) will include: (1) Improving knowledge and awareness of mercury flows, so

49 UNIDO (2018) Curbing illicit mercury and gold flows in West Africa: Options for a regional approach. United Nations Industrial Development Organisation (UNIDO), Geneva

that trade regulations and the organizations charged with enforcing them are better informed(action 3.1 and 3.2), (2) Standardization of mercury-specific regulatory trade frameworks to generate a concerted and organized regional response(action 3.4), (3) Improving the engagement with, and capacity of, customs organizations, which are often the first line of defense against illicit mercury flows(action 3.3 and 3.5), (4) Focusing regional efforts on import and export hubs, in particular seaports, which act as a checkpoints in regional supply chains, in order to focus resources more effectively and efficiently(action 3.6).

5.1.4. Involvement of stakeholders in NAP implementation

The NAP proposes to address the involvement of stakeholders in the NAP implementation through: (1) building capacities and engaging stakeholders (governmental and non-governmental) of ASGM in NAP implementation and assigning clear responsibilities to all relevant stakeholders, (2) establishing and maintaining a communication platform as well as its schedule between all stakeholders, and (3) designing a plan for NAP progress monitoring and for consultation meetings in all nearby communities affected by mining and processing. Table 5.1 summarizes the national stakeholders of ASGM and their potential intervention.

Table 5.1 *Stakeholders in NAP implementation*

No	Stakeholder	Stake/ intervention responsibilities + possible roles in NAP implementation and formalization
1	RMB	Coordinating the exploration, licensing, inspection and regulation of the ASGM sector Capacitating private sector on different aspects of ASGM
2	REMA	Focal point institution of the Minamata convention Coordinating NAP implementation through the steering committee with a main target of promoting and ensuring the protection of the environment and communities in ASGM areas through decentralized structures of governance.
3	RRA	Assessing, collecting, and accounting for tax, customs and other specified revenues.

No	Stakeholder	Stake/ intervention responsibilities + possible roles in NAP implementation and formalization
4	MINALOC	Development and implementation of the NAP Monitoring and evaluating compliance with laws and regulations through different actors at local levels such as Districts and sectors staff in charge of environment, staff in charge of social affairs, representatives of women, and mining inspectors
5	MINEFOCIN	Provision of sufficient financial resources in ASGM governance and regulation and fiscal provisions conducive to minerals sector investment.
6	MINICOM	Issuance of mineral trading licences for mineral dealers
7	Higher learning institution	Conducting research on environmental issues, socio-economic issues, and health impacts of the ASGM sector Developing curricula and training at different levels the actors of the sector (technical engineers, researchers, healthcare professionals)
8	MINEDUC	Oversees the Workforce Development Authority, whose services are structured around vocational training, entrepreneurship development, setting industry standards and regulation and accreditation. Primary and secondary schools in the mining community constitute the channel of all kind of awareness in the mining communities.
9	MINIJUST	Development/review, dissemination and coordination of the implementation of policies, strategies and programmes of ASGM, Review of regulations the law and their enforcement through dissemination of standards and norms applicable to law enforcement and correctional services; Promotion of cooperation between national, regional and international institutions in charge of law enforcement, on different aspects of ASGM including illegal trade of minerals and mercury
10	MoH/ RBC	Coordinate and improve research activities related to ASGM, educate prevention, education, and provision of treatment to people at all levels Training local health care officers and medical service providers; coordinating health related researches, Contribute to the development/ review of policies, laws and regulations related to occupational health and safety in ASGM concessions and surrounding communities

No	Stakeholder	Stake/ intervention responsibilities + possible roles in NAP implementation and formalization
11	MIFOTRA	Develop, disseminate and coordinate the implementation of policies, strategies and programs related to public servants and related sectors including ASGM; build institutional and human resources capacity in the sector; Reinforce Occupational Safety Health System in ASGM
12	MoE	Elaboration of sectorial policies projects and programmes; Oversight of institutions engaged in implementation and related resource mobilisation; Functional departments and units key to the success of ASGM.
13	MIGEPROF	National gender agenda in ASGM, inclusive of support to other government institutions in gender-responsive budgeting, planning, implementation, M&E, Building gender competence and promotion of related targets, inclusive of Rwanda's 2020 target of 30% women's employment in all sectors, including the mining sector.
14	Mining Companies and Cooperatives	Implementation of policies, laws and regulations of mining sectors including those of ASGM, Providing inputs from the point of view of miners regarding current practices, needs, and political, economic, legal, and social barriers to change, and advising on the feasibility of better mining practices and proposed policies and regulations
16	Rwanda Mining Association (RMA)	As a bridge between governmental agencies and mining companies and cooperatives, RMA will facilitate the communication and will oversees the implementation of different regulations, law and policies related to ASGM
17	Rwanda Media and communication groups	Communicating socio-economic, environmental and health issues associated with the sector to the general public, including mercury effects, advocating for miners 'and traders' rights
18	Rwanda Women in Mining Association (**RWIMA**)	Promoting the integration of Rwandan women in the mining sector in particular and the extractive sector in general. RWIMA brings together women operating in the mineral and quarrying sectors at national level

The coordination of the NAP implementation process will be done under the direction of the National Steering Committee for the NAP implementation.

Establish and maintain a communication schedule between all stakeholders (Action 4.1)

To ensure an effective implementation of the NAP, under the leads of REMA, the steering committee will establish a communication plan between key actors of ASGM. The communication chain should include all levels of stakeholders including different governmental institutions representative, mining companies or cooperatives representatives selected under the coordination of Rwanda mining Association (RMA), miner's (processors) representative. In this process, the role of the local government (district, sectors, cell, and villages) in NAP implementation and maintenance of the communication should be taken into consideration.

At national level, three annual meetings of key actors mapped above should be conducted (Action 5.2). The first can be done at the beginning of the fiscal year, the second in the middle of the fiscal year and the last at the end of the fiscal year. In the first meeting, the annual activities will be elaborated and approved by the steering committee. The approved activities will be communicated to the stakeholders for implementation.

At district level, the implementation will be overseen by the RMB inspectors and the district's environmentalist. RMB inspectors will be responsible of compiling the progress, challenges and other issues that need to be addressed in the future. Their annual report will be shared with the steering committee and will be used for progress evaluation and future planning.

For legal and policy activity governmental institutions and ministries such as RMB, RWB, REMA, MIFOTRA, MINALOC and RBC, will designate staff that will be responsible for related activities and ensuring the implementation of selected activity. Preferably, the staff would be the current member of the steering committee from those institutions.

In the middle of the fiscal year, members will meet to assess the progress and set up the plan for the second part of the fiscal year based on the reports from different actors as indicated above. Towards the end of the year, the overall evaluation of the progress will be evaluated, and the activities of the next fiscal year as well as required resources will be determined.

Hold consultation meetings in or nearby communities affected by mining and processing (Action 4.3)

Based on the reports, the meeting of stakeholders could take place in the area where serious issues were raised. This will help in elaborating the appropriate measures for those particular problems. Such opportunity can be also exploited to disseminate relevant information such as research findings on ASGM or any other important communication. The meeting should be conducted before the last week of the month as its outcome may inspire the agenda of the awareness raising with the local community (see strategy 5.1.6 particularly the implementation approach of Action 6.3)

5.1.5. Assessment of mercury and heavy metals exposure in ASGM communities

Rwanda does not currently have indications of intentionally mercury exposure of ASGM communities. However, the geological and geochemical research state that native gold is always found to containing impuries. Thus, the most part of gold deposits appears as native gold: gold-silver, gold-silver-mercury, gold-copper, gold-palladium, and gold-platinum system minerals. Much gold is found as the finest impurity in hydrothermal nonstoichiometric minerals systems. After silver, mercury is the second most typical element impurity in native gold, followed by gold–copper system minerals, gold–iron system minerals, gold–palladium platinum, Osmium, Iridium system minerals, gold–Bismuth, Boron, Lead, Tin system minerals, gold–silver (copper)–Te system minerals, gold–silver–selenium, and S system minerals[50]. Those most prevalent gold systems involve different heavy metals and some of them have known toxicity towards living organisms. Their toxicity is enhanced by difficulties of some of organisms including human being to eliminate them once in the body.

Based on the above information, the NAP proposes to consider a precautionary approach to ensure sustainable mining free of mercury and to undertake envirnmental research that could investigate the impacts of heavy metals load in water resources of ASGM area. Therefore the NAP proposes to assess the level mercury and heavy metals exposure of the ASGM community (1) strengthening enforcement and monitoring mechanisms on environmental rehabilitation

50 Ernst Spiridonov and Denka Yanakieva, « Modern mineralogy of gold: overview and new data », ArcheoSciences [Online], 33 | 2009, Online since 09 December 2012, connection on 19 April 2019. URL : http://journals.openedition.org/archeosciences/2034 ; DOI : 10.4000/archeosciences.2034

(Action 5.4), (2) conducting regular inspection and monitoring of soil, water and air quality, tailings management, and human and animal health around the ASGM sites (Action 5.1 and 5.2) (3) Design videos or posters illustrating the impacts of mercury and other heavy metals poisoning(Action 5.3), and (4) Include baseline data of water and air quality before starting mining activities (Action 6.1) .

The actions will be done principally under the direction of the Ministry of Environment, the Ministry of Health and other research institutions. The actions will involve other stakeholders from relevant government departments, agencies and non-governmental organizations, including ASGM community representatives.

Potential laboratories that could be used include the University of Rwanda Huye or Kigali biotechnology complex laboratory, Rwanda Standard Board (RSB) laboratory and research should include chemists and toxicologists (environmental and human toxicologists). The outcomes from this research and other related issues from the wide assessment should be communicated and disseminated as indicated in other strategies.

5.1.6. Provision of information to ASGM and affected communities

The NAP proposes to establish operational networks of stakeholders to support environmentally friendly and sustainable ASGM. Participatory approaches will be used to engage miners in awareness raising, including use of sign methods that will embed knowledge and transfer to local leader for future knowledge transfer and sustainability (Action 6.2.). Such training should be conducted on the last Sunday of the month in meetings that take place in all villages and cells after the monthly community work (Umuganda). Such activity will be conducted by RMB inspectors in collaboration with local leaders (from village to the district), environmentalist of the area (agronomist of the sector, district environmentalist) and miners association or syndicates. In that meeting key aspects like the outcomes of inspections of mining practices conducted by government officials such as mining inspectors, environmental inspectors, and labor inspectors; to the local leaders, health care professional, and miners would be also disseminated (Action 6.2).

To make it more attractive, improved communication and message strategies to miners, gold processors, and community members should be selected. Those could be well designed and easy-to-understand posters, audios or videos. To be more effective, posters should be kept in public areas like market, administration office, mining sites, health facilities, schools (twelve years basic education schools, primary schools) for continuous discussion and message dissemination among community of the area (Action 6.3).

Dissemination activities may involve conducting free medical examination of the ASGM players and their surrounding community, display of materials (like videos, posters) showing visible health effects of mercury as part of the communication strategies, showcasing previous studies on mercury poisoning, and awareness raising on the need for personal protective clothing for the ASGM miners.

5.1.7. Inclusion of market-based mechanisms

The NAP proposes to lobby for import tax exemption for mercury-free technologies (Action 7.1). This could be achieved by mapping the key machines and materials that are used by mining technologies which do not use mercury. Thet local equipment dealers could also be supported by government to make the machinery more readily available to miners and that is most suitable for the types of ore deposits in Rwanda. This activity should be led by RMB and RRA and their respective ministries. At the end, the established list should be made available to mining companies.

5.1.8. revention of mercury exposure of children and women of child-bearing age

Rwanda does not currently have indications of mercury exposure of children and women of child-bearing age and therefore the NAP proposes to take a precautionary approach. This strategy will be handled similar to the strategy 1 particularly Action 1.2 and well as other activities related to prevention of mercury use provided under Actions 1.1, 5.3 and 6.1. Those actions should be supported by outcomes from research in mining areas that could show the content of mercury in water/sediments/fish near gold mining areas (action 8.1) and dissemination of information on the safer food consumption patterns for children and women in gold mining areas (Action 8.2)

However, it is very important to recall the role of overall education program (led by the ministry education) up to secondary level certificate and the regular follow up by both local government (district, sector, cell and village) in the implementation. In addition, to the education policy, the Ministry of Gender and Family Promotion (MIGEPROF) has contributed a lot through its mandate of implementing the national gender agenda, inclusive of support to other government institutions in gender and family-responsive, planning, implementation, and M&E, building gender competence and promotion of related targets.

The impact of both Ministries should be always exploited by the steering committee.

5.1.9. Public Health Strategy

Although the mining sector of Rwanda does not use mercury, the country is a home of a gold refinery facility that process gold from different countries of Africa where mercury is used during the extraction. Therefore, poor practice or inappropriate wastes disposal would result in staff, surrounding community and as well as surrounding environment exposure to mercury.

The Annex C Paragraph 1(h) requires that the NAP include "a public health strategy on the exposure of gold miners and their communities to mercury. It also further indicates that public health strategies to address these impacts "should include, inter alia, the gathering of health data, training for health-care workers and awareness-raising through health facilities."

Like other countries, the public health is one of the priorities of Rwanda and recently, the country committed to develop the tourism that founded to medicine.

The commitment of Rwanda towards is well articulated in the national constitution of 2015 particularly in Article 41 which stipulates that health is a Human Right: "All citizens have rights and duties relating to health. The State has the duty of mobilizing the population for activities aimed at promoting good health and to assist in the implementation of these activities. All citizens have the right of equal access to public services in accordance with their competence and abilities."

In this regards Rwanda is currently implementing Four Health sector strategic plan (HSSP4 2018–2024) that has been designed to guide the country's aspiration to become high-income country with better quality of life of the population.

According to the same HSSP4, the environmental health expectations are carried out through four strategies, (1) establish geographic information platform for sharing information between sectors, (2) strengthen capacity of environmental health entities from the national to the village level, (3) strengthen the surveillance and reporting system for environmental health key innovations, and (4) strengthen multi-sectoral coordination on environmental health related initiatives and geographic information sharing.

The problem of ASGM needs the involvement of well-coordinated stakeholders from different sectors. In strategy 4, relevant stakeholders and their stake have been mapped and working mechanisms were briefly described in the same strategy. However, it is still worth to highlight the leading role of Rwandan healthcare system (mainly RBC) in addressing key issues related to public health concerns originating from ASGM activities. Such intervention should bring short term and long-term answers.

The short-term answers should include for example the annual trainings on ASGM-related health issues and vulnerabilities of women and children among mining communities, local leaders, healthcare professionals (Action 9.2). This will help in address the lack of knowledge on the impact of Mercury and ASM in general, that was identified in different direct actors of ASGM and healthcare professionals of the mining areas which generally nurses, and community health care workers.

Those trainings should be preceded by the development of Standard Operating procedures (SOPs) and processes to support engagement and response to ASGM-related health issues as needed on the clinical management of cases of the public health management of ASGM related exposure and accidents. These SOPs will include directives on how to administer first aid treatment on heavy metal intoxication and other related ASGM-related health issues (Action 9.5).

However, for sustainability, the impact of ASGM and the mining sector on public health should be included in the curricula of University programs that are used to train healthcare professionals and could be captured in modules like human toxicology or environmental toxicology (Action 9.1).

It is also important to underline the high priority of addressing some gaps in ASGM related to lack of appropriate equipment (such as ventilation ducts and fans); safe working procedures (and their enforcement); lack of commitment of many artisanal miners to OSH and lack of multiple entrance/exits to undeG-GRound mines. The existence of one entrance is a big gap, which can be led to fatal in case of a tunnel collapse. In additional PPE is rarely brought by miners (Action 9.3 and 9.4).

Despites those deviations, Rwanda has Occupational Safety and Health (OSH) Policies and Guidelines for Small Scale Mines in Rwanda[51] and is being implementing a national Occupational Safety and Health (OSH) strategy (2019-2024)[52]. The implementation of the strategy is overseen by two levels of steering committees: high level National steering committee (HLNSC) and National technical steering committee and inspection team. As previously indicated, OSH staff are not also aware of the effects of mercury in ASGM and could not provide relevant relationship between certain health problem observed in mining community with occupational health risks and therefore, trainings are urgently needed for OSH inspectors. This could be conjugated with the integration of effects of chemicals used in ASGM as well as the effects from some worst mining practices such as propagation of diseases like malaria, diarrhea, TB, HVS/AIDS, pneumoconiosis generated by long-term exposure to dust, and hearing capacity loss due to noise pollution. Such as activity should be led by MIFOTRA and deputed by MoH, while the implementation could be insured by the OSH steering committee through the OSH inspectors that operate at district level.

All those should be supported by real data from different research that could be conducted in the mining communities and their living environment (including water, air and biota) (Action 9.5.)

51 MIFOTRA(An Occupational Safety Health System for small scale Mines in Rwanda Available at: https://www.bgr.bund.de/EN/Themen/Min_rohstoffe/Downloads/Rwanda-Report-small-scale-mines.pdf?__blob=publicationFile&v=4

52 MIFOTRA(2019)Occupational__Safety_and_Health_Strategy__2019-2024_.pdf available at: https://www.mifotra.gov.rw/fileadmin/user_upload/Mifotra/Publication/_POLICIES/NATIONAL_

5.2. Work Plan and Budget

Table 5.2 *Work plan and budget for the proposed actions*

Strategy	Actions	Priority	Lead stakeholder	Other stakeholders	Timeline			Funding source	Activity cost (USD)	Expected output	Indicator
					2023	2024	2025				
1. Prevention of wastes practices	1.1 Develop and broadcast training videos of the better mining practices and new technologies that have replaced the use of mercury based on understudied gold processing workflows,	High	RMB	MoE, RMB, MoH, REMA Rwanda Media (TVs)	X			Annual budget of government of the Republic of Rwanda	30,000	Stakeholders are aware of the best mining technologies which don't use mercury.	At least 5 broadcasts of the video on televisions in Rwanda, and in 4 SGM concession communities.
	1.2 Promote the adoption of technologies with a higher gold recovery without mercury use or any other harmful chemical by miners based on understudied gold processing workflows,	high	RMA	MoE, RMB, Miners, RMA FONERWA MINECOFIN GEF		x	x	Annual budget of government of the Republic of Rwanda	190,000.00	Higher gold recovery without mercury use technologies are implemented in different concessions.	At least 4 main ASGM have started to use improved gold recovery technologies.
	1.3. Raise awareness among miners on the use of PPEs during mining,	high	OSH	MoE, RMB, Miners, RMA FONERWA MINECOFIN, Local government	X	X	X	Annual budget of government of the Republic of Rwanda	10,000	Miners are using PPEs during their routine work.	Number of trained miners.
	1.4 Train miners on watershed management practices to boost their skills on mine closure and rehabilitation,	High	RWB	RMB, RWB, REMA	x	x	x	Annual budget of government of the Republic of Rwanda	25,0000	Miners are equipped with sufficient knowledge on watershed management.	Number of trainings and trained people.
	1.5 Raise the awareness of miners on the non-use of mercury and other chemicals as well as proper tailings management in the mining laws, regulation and policy,	High			x			Annual budget of government of the Republic of Rwanda	20,000	Mines are closed and rehabilitated effectively.	Number of mines holder awarded certificate for a successful rehabilitation, number of people fined.
	1.6 Regular monitoring of ASGM sites.	high	RMB	MoE, RMB, MINJUST, MINRENA, RWB, REMA	x	x	x	annual of government of the Republic of Rwanda	100,000	Monitoring plan is established . At least 90% of miners compliant .	Monitoring reports.

Strategy	Actions	Priority	Lead stakeholder	Other stakeholders	Timeline			Funding source	Activity cost (USD)	Expected output	Indicator
					2023	2024	2025				
2. Facilitation of formalization	2.1 Develop and implement a plan for stakeholder engagement and participation in the formalization process;	high	MoE through RMB and REMA	MoE, RMB, MINJUSTE, MINRENA, RWB, REMA	x			Annual budget of government of the Republic of Rwanda	30,000	A clear and achievable plan for ASGM formalization is established in participatory approach.	Minutes of the meetings; ASGM formalization strategy document available.
	2.2 Improving the capacity of institutions to raise awareness and manage mercury flows, so that trade regulations and the organizations charged with enforcing them are better informed.	High	RMB	MoE, RMA, REMA, MIFOTRA, MINECOFIN, RRA, MoH, Higher learning institution, MINALOC	x	x	x	Annual budget of government of the Republic of Rwanda	40,000	Support on legal reform on trade enhanced enforcement of trade regulations.	Number of awarenessca mpaigns. Mercury flow reports.
	2.3 Elaborate an achievable plan for ASGM transformation to medium scale,	High	RMB	MoE, RMA, REMA, MIFOTRA, MINECOFIN, RRA, MoH, Higher learning institution, MINALOC	x			Annual budget of government of the Republic of Rwanda	30,000	A plan that takes into consideration of different dimensions of ASGM is developed and implemented.	Minutes of validation workshop of the plan.
	2.4 Review of the institutional capacity required by formalization and identify resources to enhance this capacity;	High	MoE	MoE, MINJUSTE, RMB, REMA, RWB, MFOTRA, MoH, MINEFOCIN, MINICOM	x			Annual budget of government of the Republic of Rwanda	20,000	Areas/ institutions that needs to be strengthened and the gaps to fill are identified as well as required resources.	The budget allocated to formalization process. Number of trainings conducted. New staff recruited, new or updated organigram.
	2.5 Train miners on financial access, project elaborationand taxation	High	MIN ECO FIN	MINICOFIN, RMB, RRA, private organization	x			Annual budget of government of the Republic of Rwanda	30,000		Number of miners trained on Financial access.

Strategy	Actions	Priority	Lead stakeholder	Other stakeholders	Timeline 2023	2024	2025	Funding source	Activity cost (USD)	Expected output	Indicator
2. Facilitation of formalization	2.6 Perform review policy and regulations and update laws and regulations as necessary to encourage formalization;	High	RMB	MoE, RMB, RMA, Miners, REMA, MoH, MINEDUC	x	x		Annual budget of government of the Republic of Rwanda	30,000	Mercury and other chemicals ban in ASGM is captured in the revised re gelation and law.	Regulation banning the use of Mercury and other chemicals in ASGM are available and advertised.
	2.7 Develop and implement initiatives to improve miners access to credit and financial management skills as part of the formalisation strategy,	High \	MIN ECO FIN	MINICOFIN, RMB, RRA, private organisation and CSOs, National Bank	x	x		Annual budget of government of the Republic of Rwanda	10,000	ASGM companies and cooperatives are facilitated to access to finance and to lower interest's rate.	Number of credit facilities accessed by ASGM companies .
	2.8 Conduct mineral exploration and reserves estimation,	High	RMB	MoE, RMB, MINECOFIN	x			Annual budget of government of the Republic of Rwanda	50,000	More and accurate exploration studies are conducted, and results are made available to the investors	Higher resolution Geological and geochemical map produced.
	2.9 Establishment of an integrated information management systems for ASGM activities.	High	RMB	MoE, RMB, RMA	x	x		Annual budget of government of the Republic of Rwanda	40,000	All information of ASGM are gathered and digitized	ASGM MIS is available and accessible for use.
	2.10 Disseminate to stakeholders the outcomes from the formalisation process.		RMB	RMB, media, RMA		x	x	Annual budget of government of the Republic of Rwanda	20,000	Awareness of the new direction of ASGM by key stakeholders	Number of awareness events and lesson learnt

Strategy	Actions	Priority	Lead stakeholder	Other stakeholders	Timeline			Funding source	Activity cost (USD)	Expected output	Indicator
					2023	2024	2025				
3. Management of trade and prevention of diversion of mercury	3.1 Develop a system to regulate importation of mercury,	Low	RRA	RRA, MINCOM, RMB, REMA, RSB			x	Annual budget of government of the Republic of Rwanda	25,000	Improved mercury monitoring at the ports of entry.	mercury importation systems established
	3.2 Develop a coordination mechanism on curbing mercury trade with other countries,	Low	RRA	RRA, MINICOM, RMB, RSB			x	Annual budget of government of the Republic of Rwanda	20,000	Regional Mercury trade is regulated and formalized	Minutes and MoU on Mercury trade with neighboring country
	3.3 Raise awareness and knowledge on mercury flows, so that trade regulations and the organizations charged with enforcing them are better informed,	High	RRA	MINICOM, MoE, RMB, RMA, REMA		x		Annual budget of government of the Republic of Rwanda	32,000	Improved inventory of mercury-related trade.	Mercury trade database.
	3.4 Harmonization of mercury-specific regulatory trade frameworks to generate a concerted and organized regional response with neighbouring countries,	Low	RRA	MoE, MINICOM, RRA, RMB, REMA Governments from neighbouring countries			x	Annual budget of government of the Republic of Rwanda	25,000	Harmonized regulations on mercury trade.	Number of harmonized regulations.
	3.5 Capacitate customs organizations, which are often the first line of defense against illicit mercury flows,	High	MINICOM,	RRA, MINICOM, MINECOFIN		x		Annual budget of government of the Republic of Rwanda	35,000	Maintenance of no illicit mercury flow cases	Number of border personnel trained, list of screening equipment procured
	3.6 Participate in regional efforts on import and export hubs, in particular seaports, which act as a checkpoint in regional supply chains, in order to focus resources more effectively and efficiently.	Low	MINICOM	MINICON, RRA, MoE, REMA			x	Annual budget of government of the Republic of Rwanda	15,000	Maintenance of no illicit mercury flow cases	Number of regional workshops on mercury Number of regional personnel trained on mercury management at the ports of entry

Strategy	Actions	Priority	Lead stakeholder	Other stakeholders	Timeline			Funding source	Activity cost (USD)	Expected output	Indicator
					2023	2024	2025				
4. Involvement of stakeholders in NAP implementation	4.1 Map and engage stakeholders (governmental and private) of ASGM in NAP implementation according to their roles,	High	REMA	REMA, MoE, RMB, MINALOC, MoH, MIFOTRA, MINICOM, MINECOFIN	x			Annual budget of government of the Republic of Rwanda	25,000	Stakeholders and their stake are identified and assigned responsibilities	Minutes of the meetings and list of the stakeholders A workplan to support the implementation of NAP
	4.2 Establish and maintain a communication between all stakeholders,	High	REMA	REMA, RMB, RMA	x			Annual budget of government of the Republic of Rwanda	10,000	The plan is established and shared with concerned stakeholders	Diffusion list of the plan, meeting minutes and calendar of the meeting
	4.3 Hold consultation meetings in or nearby communities affected by mining and processing.	High	REMA	MINALOC, RMB, RMA, RBC	x			Annual budget of government of the Republic of Rwanda	20,000	Miners and surrounding community are informed about the NAP an its implementation, including mining effects on the environment and health	Number of the meetings Post and pre-meeting evaluations
5. Assessment of mercury and other heavy metals exposure of ASGM communities	5.1 Conduct mercury and other heavy metals analysis in soil, plant water and animals in ASGM regions,	High	REMA	REMA, RMB, higher learning institutions, MoH/RBC	x			Annual budget of government of the Republic of Rwanda	60,000	Researches are conducted, disseminated to different stakeholders, published in scientific journals	Numbers of samples analyzed for mercury and other toxic heavy metals, Number of seminars for results dissemination .
	5.2 Facilitate the keeping of records on water and air quality by miners before and during mining activities,	High	RDB	Mining companies, RMB, REMA, RDB	x			Annual budget of government of the Republic of Rwanda	20,000	Baseline water quality data on mercury and heavy metals results in the mining region are included in EIA	EIA with water quality data
	5.3 Develop videos and posters illustrating the impacts of mercury and other heavy metals,	High	MoH /RBC	RMB, RMA, REMA, MINECOFIN, MINALOC	x			Annual budget of government of the Republic of Rwanda	25,000	Increased knowledge and awareness on the impacts of mercury	Video products Posters produced Broadcasts of the video on televisions in Rwanda, and in 4 SGM concession communities
	5.4 Strengthening enforcement and monitoring mechanisms on environmental rehabilitation and tailings management.	High	RDB	RDB, REMA, FONERWA, RWB	x			Annual budget of government of the Republic of Rwanda	24,000	Improved environmental rehabilitation	Number of enforcement officials trained on rehabilitation of the environment and impact assessment

Strategy	Actions	Priority	Lead stakeholder	Other stakeholders	Timeline 2023	Timeline 2024	Timeline 2025	Funding source	Activity cost (USD)	Expected output	Indicator
6. Provision of information to ASGM and affected communities	6.1 Awareness-raising on risks of miners and surrounding communities involved in ASGM including community leaders, miners, health care professionals ,	High	REMA	MINALOC, RMB, Mining companies, MoH/RBC		x	x	Annual budget of government of the Republic of Rwanda	20,000	Training materials or Video on ASGM risks including Mercury are developed and awareness campaign are conducted.	Minutes for the approval of the video or the training manual, number of awareness campaign, list of participants.
	6.2 Share the outcomes of inspections of mining practices conducted by government officials such as mining inspectors, environmental inspectors, and labor inspectors; to the local leaders, health care professional, and miners,	Low	RMB	RMB, REMA, MIFOTRA, RBC			x	Annual budget of government of the Republic of Rwanda	7,000	Inspections are conducted and reports are generated	Diffusion list of the report, Number of seminars inspection outcome dissemination.
	6.3 Facilitate improved communication and delivery of messages to miners, gold processors, and community members,	High	REMA	RMB, REMA, MINALOC	x			Annual budget of government of the Republic of Rwanda	8,000	Knowledgeable mining community with good communication skills	Number of engagement meetings with mining communities
7. Inclusion of market-based mechanisms	7.1 Exemption of gold extraction technologies which don't use Mercury,	High	MINICOM	MINICOM, RRA, RMB	x	x		Annual budget of government of the Republic of Rwanda	10,000	Importation of materials/equipment for higher gold recovery technologies which don't use Mercury is facilitated	Number of technologies with tax exemption
	7.2 Lobby for support of the establishment of local distributers of mineral processing machinery and the associated services	High	MINICOM	MINICOM, RRA, RMB	x	x		Annual budget of government of the Republic of Rwanda	0	Supported installation, training and optimisation of mercury free processing equipment for mine sites.	Number of lobby initiatives. Number of local distributers supported.
	7.3. Engage GGR to provide funding to ASGM operations and in return would be repaid in the gold produced from the mine. A portion of the gold would go to repaying the initial investment made in the mine.	High	MoE	MoE, RMB		x	x	GGR		ASGM are capacitate.	Number of supported ASGM.

Strategy	Actions	Priority	Lead stakeholder	Other stakeholders	Timeline 2023	Timeline 2024	Timeline 2025	Funding source	Activity cost (USD)	Expected output	Indicator
8. Prevention of mercury exposure of children and women of child-bearing ages	8.1 Quantify the amount of mercury and other heavy metals in water/sediments/fish near gold mining areas,	Medium	MIGEPROF , MoH	MINEDUC, MINIJUSTE REMA			x	Annual budget of government of the Republic of Rwanda	60,000.00	Improved quality of water sediments and aquatic foods in terms of mercury.	Sample analysis reports with mercury as a parameter.
	8.2 Dissemination of information on the safer food consumption patterns for children and women in gold mining areas,	Medium	MoH	REMA		x	x	Annual budget of government of the Republic of Rwanda	30,000.00	Awareness on food safety with respect to mercury and other heavy metals.	Number of awareness campaigns on food safety and mercury.
9. Public health strategy	9.1 Include in the mining and health related curricula the component of health issues in mining,	High	MINEDUC	MINEDUC, Universities, RMB, MoH/RBC	x			Annual budget of government of the Republic of Rwanda	15,000	University programs are reviewed and toxicology and other health impacts of ASGM are included.	Reviewed programs focusing on ASGM toxicology and effects.
	9.2 Conduct annual trainings on ASGM-related health issues and vulnerabilities of women and children among staff members, healthcare professionals and local community leaders,	High	MoH	MoH/RBC, RMB, REMA, MIFOTRA, MINALOC	x			Annual budget of government of the Republic of Rwanda	40,000	Training manual is developed, awareness is raised among the concerned stakeholders	Number of health care practitioners in mining regions trained on identifying and treating ASGM related health issues. Training manuals Training workshop reports
	9.3 Update occupational Safety Health System(OSHS) of ASGM by including clauses related to chemicals and risk of exposure to silica (or other) dust from grinding/milling or,.	High	MIFOTRA	MIFOTRA, MoH/RBC	x			Annual budget of government of the Republic of Rwanda	20,000	A reviewed OSH with clauses that protect ASGM actors from chemicals is elaborated	Minutes of the validation of the document' Diffusion list to users
	9.4 Reinforce Occupational Safety Health System	High	MIFOTRA	MIFOTRA and MoH/RBC	x			Annual budget of government of the	10,000	Regular inspections are conducted and people	Number of inspections on OSH.

Strategy	Actions	Priority	Lead stakeholder	Other stakeholders	Timeline			Funding source	Activity cost (USD)	Expected output	Indicator
					2023	2024	2025				
	9.5 Monitor and review of audits on the level of Mercury in both air and environment around the Rwanda gold refinery facility,	High	REMA	Rwanda refinery facility, RMB, REMA, higher learning institutions research groups		x		Annual budget of government of the Republic of Rwanda	15,000	Research around the refinery facility are conducted, published and disseminate to the stakeholders	Number of dissemination seminars and DOI of a published papers
	9.6 Establish SOP for mining health related problem diagnostic and management, and train health care professions in the mining sector for its applicatio.	High	MINISANTE,	RMB, MIFOTRA, MoE, REMA	x			Annual budget of government of the Republic of Rwanda	15,000	Health professionals know how the deal with mining health related problem	SOP is there and number of trained staff.
Total									**1,476,000**		

6. EVALUATION MECHANISMS

Evaluation activities will be carried out using as basis the benchmarks and targets as outlined in the plan and the criteria and indicators as agreed upon by the stakeholders.

Monitoring and evaluation for this project will rely on several levels of review, quality control and feedback. The National Steering Committee including the main project stakeholders will meet annually to: (a) review and approve annual work plan, (b) assess progress against monitoring and evaluation targets as indicated in the Project Results Framework, (c) approve interim and final reports, and (d) assess any gaps or weakness and make appropriate adaptive management decisions based on progress and achievements.

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ANNEXES

Annex 1: Terms of reference of the Working Group (National Steering Committee)

1. Introduction and background

The Minamata Convention on Mercury (hereinafter referred to as the Convention) was adopted in October 2013 and entered into force on August 16, 2017 with ninety-five (95) countries as Parties to the Convention, including Rwanda that ratified it on 29th June 2017. Today, 131 Countries have already ratified the Convention.

For the proper implementation of the Convention, Global Environment Facility (GEF) avails financial support to the state Parties to enable them to establish their future obligations under the Convention. Rwanda received funds under the project National Action Plan (NAP). The NAP aims to assist the Republic of Rwanda to prepare the implementation of future obligations under the Convention. Article 7 of the Convention requires countries with more than insignificant use of mercury in Artisanal and Small-Scale Gold Mining (ASGM) operations to develop within three years of the treaty entering into force a NAP in order to reduce the use of mercury and mercury compounds in the sector. In the case of Rwanda the NAP was undertaken as a precautionary measure to ascertain potential mercury use in ASGM in view of the perceived considerable use of the same in Rwanda's neighbouring countries.

2. Role and responsibilities NAP National Steering Group (NSG)

The working group will comprise of technical and policy experts from Rwanda Environment Management Authority (REMA), as well as representatives from relevant key ministries, institutions, Civil Society Organizations, and Private Sector, industrial associations and UNIDO. This working group will provide strategic inputs and overall guidance and coordination for the execution of the activities. REMA will act as the chair and secretariat of the NSG. The main role of NAP National Steering Group is to facilitate and steer the monitoring implementation of NAP projects proposed under this NAP.

3. The NAP NSG will have the following specific responsibilities:

1. Being informed on each activity related to the ASGM-NAP projects;
2. Represent interests of all the stakeholders involved in the implementation of the projects;
3. Ensure that the planned activities are aligned with action plan of ASGM-NAP project;
4. Provide high level orientation and policy guidance for the effective and efficient implementation of ASGM-NAP;
5. Identify priority areas/sectors in which projects could focus
6. Approve studies, research and reports conducted in framework of NAP project; Participate in joint action planning, analyzing and validating NAP action plan;
7. Participate in various consultative meetings, trainings and workshops related to the implementation of the NAP project;
8. Review periodic monitoring and evaluation reports of ASGM-NAP project;
9. Provide guidance and oversight in the implementation of all projects;
10. NSG will in particular be in charge of the legislation and policy review and data collection for the initial national inventory pertaining to future obligations
11. Validate all reports related to NAP before being endorsed by the competent authority.

4. Composition

The NSG will be a permanent committee, and after the completion of NAP, it will serve as the chemical convention Steering Committee. It will be composed of representatives (senior staff) from relevant stakeholders including government institutions, Non-Government Organizations, academia (High learning Institutions), civil society, research institutions and private sector to ensure involvement across sectors.

Members of NSG will be senior staff from: Ministry of Environment (MoE), Ministry of Health (MoH), Ministry of Trade and Industry (MINICOM), Ministry of Public Service and Labour (MIFOTRA), Rwanda Standard Board (RSB), Rwanda Mining Board (RMB), National Industrial Research and Development Agency (NIRDA), Rwanda Utilities Regulatory Authority (RURA), Water and Sanitation Corporation (WASAC), University of Rwanda College of Science and Technology (UR-CST), Private Sector Federation (Enviroserve), Rwanda Environmental NGO's Forum (RENGOF), Rwanda Mining Association (RMA), Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA), Depot Kalisimbi, ARECO Rwandanziza, repr.

5. NSG Meeting arrangement

National Steering Committee meetings will be convened on Quarterly basis to discuss the progress implementation of NAP project. However, it may also be convened whenever deemed necessary.

Annex 1: Geographical Coordinate of different concessions

No	Name	Type	Parties	Commodit	Part Name	District	Sector	X	Y
1	Burushya	EL	EFEMIRWA MINING LTD	Au, C, Col, W	Part 1	Gakenke	Cyabingo-Busengo	29°41'23"	1°36'56"
2	Burushya	EL	EFEMIRWA MINING LTD	Au, C, Col, W	Part 2	Gakenke	Cyabingo	29°41'48"	1°36'3"
3	Burushya	EL	EFEMIRWA MINING LTD	Au, C, Col, W	Part 3	Gakenke	Cyabingo	29°41'31"	1°35'45"
4	Buturuba	SSML	COOPERATIVE DUSU-ZUMIMIRIMO	Au, W	Part 1	Burera-Gak-enke-Rulindo	Nemba-Gashenyi-Base	29°51'34"	1°36'45"
5	Bweyeye 1	SSML	Faraise Company Ltd	Au	Part 1	Rusizi	Butare	29°9'29"	2°34'6"
6	Bweyeye 2	SSML	Faraise Company Ltd	Au	Part 1	Rusizi	Bweyeye	29°10'3"	2°34'26"
7	Gaseke	SSML	Migetraco Ltd.	Au, C, Col, W	Part 1	Nyamasheke	Kanjongo	29°10'39"	2°21'49"
8	Kababara	SSML	COOPERATIVE COMIKAGI	Au, BS, C, Co, Col, MCC, MCW, Ni, SG, T, W	Part 1	Gakenke	Ruli	29°48'44"	1°50'50"
9	Kigarama Block	EL	NYABITIMBO123M-INING LTD	Au, C, Col, W	Part 1	Rusizi	Gitambi	29°0'3"	2°36'6"
10	Kigarama Block	EL	NYABITIMBO123M-INING LTD	Au, C, Col, W	Part 2	Rusizi	Gitambi-Gashonga	28°58'45"	2°36'6"
11	Kigarama Block	EL	NYABITIMBO123M-INING LTD	Au, C, Col, W	Part 3	Rusizi	Gitambi-Gashonga	28°58'35"	2°35'21"
12	Miyove_Ruse-kera_Mubuga_ Gitovu_Ruhunde	SSML	NGALI MINING LTD	Au	Part 1	Burera	Ruhunde	29°55'51"	1°33'23"
13	Miyove_Ruse-kera_Mubuga_ Gitovu_Ruhunde	SSML	NGALI MINING LTD	Au	Part 2	Burera	Ruhunde	29°56'33"	1°35'12"
14	Miyove_Ruse-kera_Mubuga_ Gitovu_Ruhunde	SSML	NGALI MINING LTD	Au	Part 3	Burera	Miyove-Nyankenke	29°58'50"	1°37'7"
15	Miyove_Ruse-kera_Mubuga_ Gitovu_Ruhunde	SSML	NGALI MINING LTD	Au	Part 4	Burera	Miyove-Ruhun-de-cyungo-rukozo	29°56'52"	1°35'29"
16	Miyove_Ruse-kera_Mubuga_ Gitovu_Ruhunde	SSML	NGALI MINING LTD	Au	Part 5	Burera	Miyove-Nyankenke	29°58'29"	1°36'19"
17	Nkanda	SSML	Jasper Minerals Supplies Ltd	Au, C, Col, W	Part 1	Nyaruguru	Busanze-Ruheru	29°28'49"	2°47'14"
18	Nkoma1&2	SSML	UH MINING COM-PANY LTD (100%)	Au, W	Part 1	Gicumbi	Nyamiyaga-Rutare	30°8'29"	1°42'7"
19	Nkoma1&2	SSML	UH MINING COM-PANY LTD (100%)	Au, W	Part 2	Gicumbi	Nyamiyaga-Rutare	30°9'12"	1°43'10"
20	Nyagatama1	SSML	NIYIGENA MIN-ING COMPANY	Au, BS, C, Co, Col, MCC, MCW, Ni, SG, T, W	Part 1	Ngororero	Nyange	29°34'2"	2°1'41"
21	Nyamugari	SSML	COOPERATIVE COMIKAGI	Au, BS, C, Co, Col, MCC, MCW, Ni, SG, T, W	Part 1	Gakenke	Ruli	29°50'21"	1°50'15"
22	Nyamugari	SSML	COOPERATIVE COMIKAGI	Au, BS, C, Co, Col, MCC, MCW, Ni, SG, T, W	Part 2	Gakenke	Ruli	29°50'13"	1°50'5"
23	Nyamugari	SSML	COOPERATIVE COMIKAGI	Au, BS, C, Co, Col, MCC, MCW, Ni, SG, T, W	Part 3	Gakenke	Ruli	29°49'47"	1°49'47"
24	NYANZA -HUYE	EL	HCK MINING COM-PANY LTD	Au, C, Col	Part 1	Huye-Nyanza	Rwaniro-Nyagisozi	29°40'51"	2°25'16"

No	Name	Type	Parties	Commodit	Part Name	District	Sector	X	Y
25	NYANZA -HUYE	EL	HCK MINING COM-PANY LTD	Au, C, Col	Part 2	Huye-Nyanza	Rwaniro-Kigoma	29°40'57"	2°26'43"
26	NYANZA -HUYE	EL	HCK MINING COM-PANY LTD	Au, C, Col	Part 3	Huye-Nyanza	Nyagisozi,rwabi-cuma-Rwaniro	29°41'7"	2°23'48"
27	NYANZA -HUYE	EL	HCK MINING COM-PANY LTD	Au, C, Col	Part 4	Huye-Nyanza	Rwaniro	29°42'15"	2°24'46"
28	NYANZA -HUYE	EL	HCK MINING COM-PANY LTD	Au, C, Col	Part 5	Huye-Nyanza	Rwaniro	29°42'25"	2°26'9"
29	NYANZA -HUYE	EL	HCK MINING COM-PANY LTD	Au, C, Col	Part 6	Huye-Nyanza	Rwaniro-Ki-goma-simbi	29°40'59"	2°26'50"
30	NYANZA -HUYE	EL	HCK MINING COM-PANY LTD	Au, C, Col	Part 7	Huye-Nyanza	Rwaniro-Kigoma	29°42'9"	2°27'7"
31	Nyarurama	SSML	UH MINING COM-PANY LTD	Au, Fe, W	Part 1	Gicumbi	Ruvune	30°10'22"	1°35'53"
32	Nyirabahanga	SSML	B&K BUSINESS ACTIVITY LTD	Au, BS, C, Co, Col, MCC, MCW, Ni, SG, T, W	Part 1	Bugesera	Ntarama	30°2'15"	2°5'45"
33	RUSIZI-BWEYEYE	EL	NEW KUSH RWANDA ltd	Au	Part 1	Rusizi	Bweyeye-Bu-tare-Gikundam-vura-nyakabuye	29°6'34"	2°35'39"
34	Rutungu	LSML	WAYCOR LTD	Au, BS, C, Co, Col, MCC, MCW, Ni, SG, T, W	Part 1	Nyagatare	Rwimiyaga	30°28'37"	1°11'9"