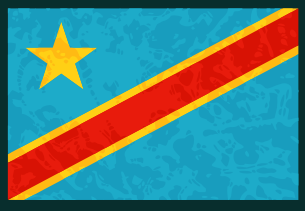
ECSA-HC BASELINE ASSESSMENT REPORT OF THE TB SITUATION IN THE MINING SECTOR

A SITUATION ANALYSIS OF TB IN THE MINING SECTOR IN ANGOLA, DRC AND MADAGASCAR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ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ANMR	Angolan National Agency of Mineral Resources
ASM	Artisanal, Small Mines
CAR	Central Africa Republic
CCM	Country Coordinating Mechanism
CDT	Center for Diagnosis and Treatment of TB
CHW	Community Health Workers
COVID-19	Corona Virus Diseases 2019
CSO	Civil Society Organization
DALY	Disability-Adjusted Life Years
DRC	Democratic Republic of the Congo
ECSA HC	East, Central and Southern Africa Health Community
ENSOMD	Millennium Development Goals National Monitoring Survey
GFATM	Global Fund to fight Aids, tuberculosis and malaria
HIV	Human Immunodeficiency Virus
HSE	Hygiene, safety and environment
IPT	Isoniazid. Preventive Therapy
M&E	Monitoring & evaluation
MOH	Ministry of health
MW	Mine workers
NAP	National Aids Program
NGO	Non-Government Organization
NSP	National strategic plan
NTP/NAP:	National TB control program
OHS	Occupational and Health Safety
PLWH	People Living With HIV
PSM	Procurement and Supply Mechanism
Q/A:	Questions and answers
RCM:	Regional coordinating mechanism
SADC	Southern African Development Community
SAEMAE	Small Artisanal Service of Mining Expert
TB	Tuberculosis
TB NSP	Tuberculosis National Strategic Plan
TIMS	Tuberculosis in the mining sector
WHO	World Health Organization

ACKNOWLEDGMENTS

The East, Central and Southern Africa Health Community (ECSA-HC) has concluded a baseline assessment in 3 of the 6 countries that joined the TB in the Mines in Southern Africa (TIMS) project in phase III, which are Madagascar, Democratic Republic of Congo (DRC) and Angola. The baseline assessment was implemented under the sponsorship of the Global Fund.

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In Madagascar

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- Dr. NSAMBI Bulanda Joseph (Provincial Minister of Health in Haut Katanga)
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BACKGROUND

Africa has made progress in the fight against Tuberculosis (TB), unfortunately TB remains the leading cause of death from a single infection agent. TB ranks above HIV/AIDS and still ranked higher than COVID-19 despite the fact of it being declared a pandemic. Although the main culprit to the increase in TB rates has been HIV, the persistence of TB in countries with low HIV prevalence suggests that TB transmission is related to other factors as well, which include late diagnosis, failure to adhere to treatment, migration and low socio-economic status. This is even more pronounced in the Southern Africa region.

The mining industry has presented better opportunities for income generation, both in-country and outside home-countries. Mine workers are exceptionally at high risk of contracting TB. A large number of mine workers are migrants, which may expose them to multiple TB risk factors, including HIV, Health care disruptions and low-socio economic status as alluded above. Their migration further facilitates the transmission of TB to their immediate families and the general community[1]. Migration across country borders disrupts the continuum of care for miners receiving treatment, putting their health and that of their families at risk. Over exposure to silica dust impairs the ability of the immune system to control TB infection and prevent TB disease, thus another factor to increased TB deaths.

Realizing the need to address issues of TB and other occupational lung diseases among mineworkers, ex-mineworkers and their families and communities in Southern Africa, and the need to establish a regionally coordinated response to these issues, the Southern Africa Development Community (SADC) Heads of State issued a Declaration on TB in the mining sector in 2012, subsequently followed by the development of a SADC Code of Conduct to guide the process in implementation of the Declaration. A committee was then established to find resources to support the implementation of the protocol, which gave birth to the TB in the Mining Sector in Southern Africa, known as the TIMS project, whose implementation began in 2016.

Key policies supporting the TIMS project are: (i) SADC Declaration on TB in the Mining Sector (2012); (ii) Framework for Harmonized Management of TB (2014); and (iii) SADC Code of Conduct on TB in the Mining Sector (2015).

The TIMS project is a multistakeholder initiative under the stewardship of the Southern Africa Regional Coordinating Mechanism (RCM) which was established in 2016, with the first 2 project phases implemented in 10 SADC countries (Botswana, Eswatini, Lesotho, Namibia, Malawi, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe). Based on lessons learnt from the 2 project phases and the need to sustain gains, the RCM requested for additional funding to strengthen regional coordination and expand implementation to all 16 SADC countries in the phase III of the project.

[1] TB in the mining sector, developing a successful advocacy plan.

Under this phase, through the guidance of the RCM and support from the Global Fund, 6 SADC countries have joined, namely Angola, Comoros, Democratic Republic of Congo (DRC), Madagascar, Mauritius and Seychelles. Three of these countries have large scale mining industry (Angola, Democratic Republic of Congo (DRC) and Madagascar). These 3 countries have been selected for the baseline assessment which is aimed at providing initial information on the magnitude of mining, TB in the mines and their respective interventions in regards to addressing TB issues in the mining sector.

The RCM received funding from the GF and appointed ECSA-HC as the principal recipient in Phase III to support coordination and implementation of TIMS activities between 1st July 2021 and 30th June 2024. ECSA-HC, is an intergovernmental organization whose mandate is to foster regional health cooperation in its member states and within the ECSA region.

In the current phase III, all 16 SADC countries are expected to participate and be supported. Appreciating that the magnitude of mining is different in all countries, three of the 6 in-coming countries were selected for a baseline assessment due to their large scale mining. These 3 countries have also missed out in the initiatives undertaken through the TIMS project under Phase I&II. One of the priority areas under Phase III is emphasis in supporting countries with large scale mining towards elimination of TB in the mines. It is therefore on this background that Angola, DRC and Madagascar were selected to conduct the baseline assessment/situation analysis.

1 INTRODUCTION

One-third of TB infections in the Southern African region are linked to mining activities and recent research has estimated that 3% to 7% of miners are becoming ill with the disease each year (TIMS Epidemiological Baseline Study, 2012). Nine of 16 SADC member states are part of the 30 countries holding the highest burden of TB in the world[2].

The Heads of State and Governments of the Member States of the SADC Region, having recognized the disproportionate high burden of TB and TB/HIV in the mining sector and the extent to which these and other occupational diseases such as silicosis are eroding the potential contribution of the mining sector to the economic development of the region, have adopted in the Maputo summit in August 2012, a Declaration on Tuberculosis (TB) in the mining sector which aims to combat the high burden of TB, HIV infections and other occupational diseases in the mining sector and mitigate their negative impact on the potential contribution of the mining sector to the economic development of the region.

In 2015 the Global Fund responded to the request to support the implementation of the SADC declaration on TB in the mines and the TIMS project was launched, supporting 10 of the 16 SADC countries.

Phase III of the project started on the 1st of July 2021 and in this phase, all SADC Member States are part of the project, including Angola, Comoros, DRC, Madagascar, Mauritius and Seychelles. All countries have been classified according to the magnitude of mining activities and 3 of the 6 (Angola, DRC and Madagascar) were earmarked for a baseline assessment to ascertain areas of support under the project moving forward. The rationale behind selecting the three was because they had large-scale mining activities.

This baseline assessment was conducted to understand the magnitude of the burden of TB, the existing interventions and the gaps in TB prevention, control and care efforts in the mining industry, in the 3 countries (Madagascar, DRC and Angola).

It is expected that the findings of this baseline assessment will be used as baseline information to support country response towards implementation of the SADC TB in the mines declaration of 2012. The findings will support the National TB programs and its key partners (e.g ministry of mines, ministry of labor, ministry of environment, etc.) in the design of TB response strategy for the mining sector using the identified priority gaps to formulate priority interventions. Therefore, this report will serve as a resource document in the implementation of the TIMS phase III project.

[2] The nine countries of the SADC counted among 30 highest TB burden countries in the world (Source WHO, Global TB program report 2020): Angola, DRC, Tanzania, Mozambique, South Africa, Zimbabwe, Namibia, Zambia, Lesotho

Countries are encouraged to mobilize technical support for this purpose while keeping in mind that responding to TB issues like prevention, diagnostic, treatment, care and support activities in MWs, their families and communities should be an integral part of the main TB NSP.

2 RATIONALE, OBJECTIVES AND LIMITATIONS

2.1 RATIONALE

Six (6) of the 16 SADC Member States (Angola, Comoros, DRC, Madagascar, Mauritius and Seychelles) were not part of the TIMS project in Phase I and II. Angola, DRC and Madagascar have been thought to have large scale mining. Angola and DRC are also part of the 30 high TB burdened countries according to the Global TB report (2021). Since Angola, DRC and Madagascar are new to the project and have large scale mining, there is limited data available on TB in the mines. The RCM identified this gap and prioritized collection of baseline information to substantiate evidence in activities that will be rendered to the 3 countries in addressing TB in the mines.

2.2 OBJECTIVES OF THE BASELINE ASSESSMENT

2.2.1 General objective

To conduct situation analysis of TB in the mines in Madagascar.

2.2.2 Specific objectives

i. Gather baseline information on TB and other occupational lung diseases in the mining sector in the 3 countries.

ii. Document best/promising practices being implemented for controlling TB in mines in the three countries.

iii. Identify and package key intervention areas that may be supported through the TIMS project.

2.3 METHODS OF THE ASSESSMENT

An interview guide/ structured questionnaire was developed to guide the process of data collection. Through ECSA-HC appointments were scheduled with the selected countries, after which countries were visited. The questionnaire/interview guide was translated in all 3 SADC official languages (English, French and Portuguese).

The approach used for gathering information was blended between face-to-face interviews, sending self-administered questionnaires and also baseline review of available documents obtained through the internet and shared by country key informants. The lists of persons met and their respective institutions and functions are available on 15.1, 15.2 and 15.3. All countries have completed the assessment checklist. The country's visit took place from the 6th – 10th of June ; 19th – 22nd of July and 12th – 14th December 2022 respectively in Madagascar, the DRC and Angola. Country specific reports were then translated in the country's official languag, which later informed the development of this consolidated report.

2.3.1 KEY INDICATORS

A set of indicators has guided the collection of various data elements to inform the baseline situation of TB in the mining sector of the 3 countries. The assessment tool sought to understand the country's mining sector and mining community landscape.
The framework seek to understand the country's mining sector was made of 3 indicators:

- Analysis of the mining industry stakeholders
- Description of the country's mining sites
- Definition of the functional characteristics of the mining industry

Secondly, following the understanding of the mining industry and the mining community landscape, the tool focused on a set of indicators that link the mining sector to the health system. The linkage was assessed using 3 indicators:

- Integration of the mining sector in the national health sector strategic plan
- Inclusion of mineworkers as a vulnerable population to TB and other lung diseases in the TB NSP
- Estimate of TB burden among mineworkers

2.4 LIMITATIONS TO DATA COLLECTION

a) Access to the mining sites was a limitation due to high predicted logistical cost as all mining sites are located far away (beyond 500 kms) from the main cities

b) Data for Artisanal and small-scale mining activities could not be collected as these proved almost impossible to identify. Usually, ASM worked in several mines at any one-point in time
c) Data on TB among mineworkers or ex-mineworkers are not identifiable due to lack of integration of the mining sector in TB prevention and control interventions and integration of TB in mines indicators in routine data collection tools.
d) Limited knowledge of in-country key informants by the Ministries of Health
e) In Madagascar and Angola, we could not ascertain if there were any Chambers of mines, even after snowballing
f) Mining industries management differed administratively for each country, making it difficult to gather information as per the data collection tools
g) Interviews with miners or their families was also another challenge as we could not get access to them. Where ex-miners/miners could be reached, there was a bit of discomfort in disclosing information as they did not know who we were or how the information was going to be used.
h) Limited availability of key informants in Angola which has resulted in minimal amount of information and delays in completing data collection.

3 FINDINGS

3.1. COUNTRY OVERVIEW

This section of the report presents geographical and demographic overview. The section also provides information on health infrastructure.

3.1.1 ANGOLA

Geography and demography.

Angola, with its history of a 27-year civil war, is in a recovery phase and development is affected by the global economic crisis. Angola is located in the western region of Africa and the official language is Portuguese. Its population is estimated at 36,078,554 as of May 2023, with an estimated population growth rate of 3.7 annual change. Angola shares borders with DRC, Congo Brazaville, Zambia and Namibia. Angola is divided into 18 provinces (2014 INE-Census map), namely Bengo, Benguela, Bié, Cabinda, Cunene, Huila, Huambo, Cuanza Norte, Cuanza Sul, Cuando Cubango, Luanda, Lunda Norte, Lunda Sul, Malange, Moxico, Namibe, Uige, Zaire.

Figure 1: Map of Angola

About 72% of the population in Angola is concentrated in 7 provinces; the most populous being the province of Luanda, also home to the Capital city, where about 30% of the total population of the country lives. The provinces of Huila, Benguela and Huambo host 27% of the population, followed by the provinces of Cuanza Sul, Uíge and Bié with 15% of the total population. The remaining 11 provinces complete the rest of the population.

Health system, Infrastructure and Coverage

The healthcare system of Angola is comprised of public and private service providers. Public hospitals cater to almost 60% of the Angolan population, and access to health services within the public sector is free. Regardless of the free health services within the public sector, treatment is generally perceived to be highly discouraging, thus the population who can afford prefer private health service centres.

Angola has approximately 5,610 physicians (0.17 physicians per 1,000 inhabitants) and 1.3 nurses per 1,000 inhabitants. There are a total of 3,163 health facilities in Angola. According to the WHO, Angola has a major gap in the number of health care professionals who are qualified and able to address the needs of the population. Many Angolans continue to go unserved. The very few physicians are limited in their capacity to provide outreach services to the population, compounding the challenges related to delivery of quality services. Furthermore, Angola's healthcare system requires policy reforms and ideally, restructuring leading to harmonized standards for cross-border and regional cooperation.

3.1.2 DEMOCRATIC REPUBLIC OF CONGO (DRC)

Geography and demography

The DRC is located at the center of the African continent and is counted among the largest territories on the continent with 2.345.409 km² of land surface. DRC shares borders with 9 countries namely: Republic of Congo (Brazaville), Uganda, Burundi, Rwanda, Tanzania, Central Africa Republic (CAR), South Sudan, Zambia and Angola. DRC has 26 provinces. The large size of the country combined with the lack of transport and communication contributes to bottlenecks to exchanges and movements of persons and goods.

Figure 2: Map of DRC

Figure 2: Map of DRC and Haut-Katanga Province

Population Data for DRC was difficult to obtain due to political conflict and the high population migration, however, the population estimates about 89.56 million. The DRC has one of the highest population growth rates of 3.19%. With a high fertility rate of about 6.11 births per woman, the population is expected to hit 100 million by 2024. By the year 2050, DRC is projected to have a population close to 200 million.

Health system Infrastructure and Coverage

The health system of the DRC is organized in three levels. At the implementation level there are 516 health districts, where a district team manages a network of health centres and a district hospital. Across DRC's 26 provinces, there are 516 health zones, of which only 402 have functional community care sites, which only cover 10,179,461 of the population. People of DRC have little access to health care and disease outbreaks are frequent due to poor surveillance and infrastructure, compounded by the political instabilities in some districts, such as Kasai and across the eastern region of the country.

With about 8,630 physicians in DRC, there are about 0.28 doctors and 1.19 nurses and midwives per 10,000 population in DRC. Access to health care services in the rural regions is extremely low due to the remote state of many villages within the country.

3.1.3 MADAGASCAR

Geography and demography

With 596,790 km2 of land surface, Madagascar is the 4th biggest island in the world after Greenland, New Guinea, and Borneo and is located in the southwestern Indian Ocean and is separated from the African coast by the 250 miles (400 km) wide Mozambique Channel.

According to the data from the 3rd nationwide population and habitat census collated in May-June 2018, the resident population of Madagascar is estimated at 25,680,342 inhabitants with 49.3% of men and 50.7% of women. Majority of the population lives in urban areas (80.5%). The average household size is 4.2 individuals with differences according to the residential area. For the last 2 decades, the average annual population growth rate was 3.01%. The population growth speed has been much higher in rural areas (3.2%) compared with urban areas (2.4%)[3].

[3] INSTAT. Recensement Général de la Population et de l'Habitat – 2018. Résultats provisoires.

Figure 3: Map of Madagascar

Health systems, infrastructure and coverage

The last health facility census conducted in 2018 found that there were 22 university hospitals, 17 regional reference hospitals, 96 district reference hospitals and 2,645 basic health units. The ministry of health reported 15,164 health personnel, with 26% doctors, 37.9% paramedics, 16.6% administrative staff and 19.6% support workers. Despite this, the health sector suffers from gaps in human resources. Unequal distribution of the health workforce is a remarkable fact, with a tendency for higher concentrations at the central level. More than 56% of consultations are carried by public health centers. Health services are under-utilized by the population attributable to the inadequate access to transport facilities and limited geographic accessibility whereas 60% of the population lives in less than 5kms from a basic/primary health center.

3.2 THE MINING INDUSTRY BY COUNTRY

3.2.1 The mining industry in Angola

Angola has 18 provinces, with mining companies spread all over the country. The country has small, medium and large mine companies, both public and privately owned. Until 2013, diamonds were the sole significant mineral resource explored in Angola. According to the African Diamond Council, Angola is the 3rd largest producer of diamonds in Africa, with €1.2bn in annual production in 2021, making diamond one of the country's main sources of revenue. The mines of ***Luaxe*** and ***Catoca*** became, respectively, the third and fourth biggest diamond explorations in the world. The Catoca mining site has 639 000 m2 of size. In 2022, according to the Angolan executive, the country sold about 8.9 million carats of diamonds, against 7.7 million sold in 2020, an increase of 15.6 per cent.

Other minerals and their exploration have also become significant assets and areas of activity within the mining sector. Following diamond mining industry, the country produces oil and gas, having a strong impact in the country's GDP. Angola is also rich in several other mineral resources that had not been fully exploited until recent. These include Manganese, copper, gold, phosphates, granite, marble, uranium, quartz, lead, zinc, wolfram, tin, fluorite, sulfur, feldspar, kaolin, mica, asphalt, gypsum and talc.

In June 2020, the Angolan executive reformed the governance landscape of the mining sector by creating a mining national concessionaire entity, the Angolan National Agency of Mineral Resources (Agência Nacional de Recursos Minerais or ANRM). Before the creation of ANRM, Endiama EP combined the functions of sole national concessionaire and issuer of mining licenses and, in its capacity as the state-owned diamond company, participated as an operator, on behalf of the Angolan state, in the diamond concessions. Since 2020 Angola licensed 28 gold mining projects, 20 of which are already in the exploration phase. One such gold mining project is the ***Buco-Zau*** mine in the northern province of Cabinda, which after six months had generated 15kg of gold from a secondary deposit. Provisional data indicate that 619 mining titles were registered from 2018 to 2021 of which 110 prospecting titles, 268 exploration bonds and 241 with mining permits.

There are encouraging signs in Angola of the growth of private investment, facilitated by strengthened government and financial institutions and by the government's actions to boost transparency so that Angola will be able to realize the full potential of its mining sector.

3.2.2 The mining industry in the DRC

The DRCs mining sector presents a high-return opportunity. 788 mining companies are listed in DRC The Government made development of the mining sector a priority to diversify the economy, with oil being the principal resource of DRC. Since the first explorations launched

in 1970, the oil sector has become the dominant economic activity and major source of income for the state. On top of the oil, there are substantial untapped gold, cobalt and high-grade copper reserves. DRC boasts of some of the highest quality copper reserves globally. The DRC's copper wealth is situated on the copper belt in the southern part of the country. Its mining industry plays a significant role in the world's supply of cobalt, copper, diamonds, tantalum, tin, gold, and produces over 70% of the global cobalt production, which is its largest source of export income. 80% of its industrial cobalt mines are owned or financed by Chinese companies. The DRC's largest cobalt ore, copper and diamonds come from the Kasai province in the west.

By far the largest mines are located in southern Katanga province and are highly mechanized, with a capacity of several million tons per year of copper and cobalt ore, and refining capability for metal ore. The Tenke Fungurume Mine in Katanga is the largest mine in DRC. Mines include the large industrial Kibali Gold Mine, as well as many Artisanal and Small-Scale mines (ASMs).

These small-scale mines are unregulated, with problems stemming from high levels of child labor, workplace injury, mining -related illnesses including TB and other lung diseases and environmental damages.

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3.2.3 The mining industry of Madagascar

Madagascar is known for the opulence of its subsoil, resulting in the development of both small mining sectors (hand-crafted) and large mining companies. Its unique geo-diversity scattered all over the island, is the result of a long geological background with multiple phases.

The mining industry in Madagascar is widely small-scale, however, large scale mining activities are selectively located where there are large mineral deposits, in very remote locations, mostly in the northern and Southern parts of the country. The Africa Mining IQ, one of the largest companies in the Madagascar mining industry currently has 54 mining projects on its database in Madagascar. Minerals for mining in Madagascar include 15 Gold, 5 Copper, 3 Nickel, 4 Uranium, 3 Coal, 3 Ilmenite, 4 Iron Ore, 2 Vanadium, 1 Zircon, 1 Diamond, 10 Graphite, 1 lithium and 1 PGM

Although Madagascar is largely a small-scale mining country, the number of small-scale mines are estimated to be over 5,000 (according to the Ministry of mining).Attempts to map the small scale-mines has been attempted through the Ministry of Mines, however it was unsuccessful due to the number of small-scale mines and lack of regulatory frameworks for Artisanal and small-scale mining.

Madagascar has extensive deposits of minerals and produces in large scale nickel, chromium, cobalt and ilmenite. Its lateritic nickel mining, run is by the mining company called Ambatovy and is ranked among the largest in the world. Other deposits found are copper, iron and manganese ores, graphite, rock salt, niter, pyrites, graphite, chromite, bauxite, titanium, salt, quartz, cobalt, iron, coal, gold, uranium and some minor minerals. Its mining potential is noted in industrial and metallic minerals, energy, precious and semi-precious stones, as well as ornamental stones. In the northern part of the country, there are also large deposits of Gold.

Although the mining industry is largely male dominated, it was noted that women and children were involved, where they cooked and carried food and other necessities for miners.

3.3 THE TB DISEASE BURDEN IN ANGOLA, DRC AND MADAGASCAR

The TB burden remains very high in the 3 countries with Angola and DRC still within the top 30 high TB burden countries. the figure below shows the top 30 high TB burden countries.

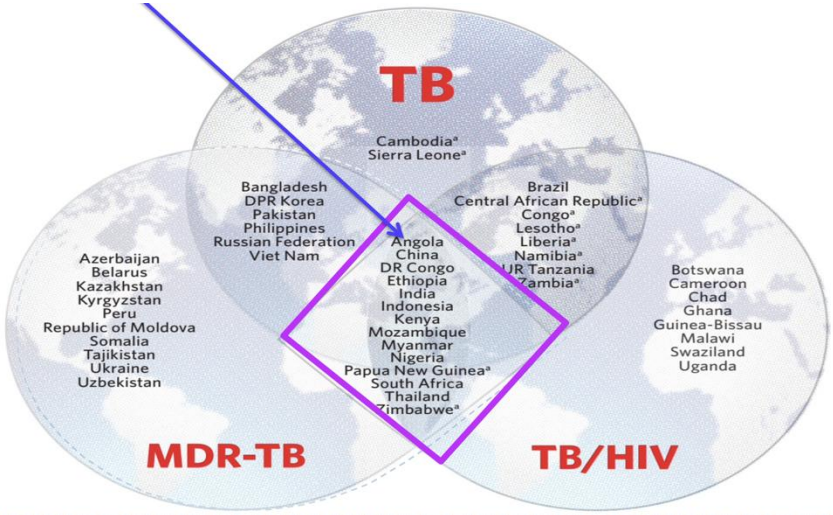


Figure 4: High TB Burden country list, WHO 2020

3.3.1 ANGOLA TB profile

Angola, is one the 14 countries in the world with the combination of the highest incidence of tuberculosis (TB), multidrug-resistant (MDR) TB and TB/HIV co-infection, as shown the figure above. TB is the 3rd cause of death among communicable, maternal, neonatal and nutrition related diseases in Angola. In 2021, 115,000 were estimated to develop TB, with 16,000 estimated to be children under age of 15 years, giving an incident of 350 per 100,000 population. These figures show that Angola is most affected country amongst the three (3). Missing TB cases were estimated to be 51,853, with over 9,000 children. 13,000 of the estimated people who developed TB were co-infected with HIV. Deaths due to TB were estimated to be around 18,000. The trend in TB notification looks quite constant as shown on the figure below. The key indicators for TB in Angola are summarized in the table below:

Table 1:TB Burden indicators, Angola, 2022

Indicators	**per 100,000**
TB incidence	325
TB prevalence	370
TB Mortality	51

Source: WHO global tuberculosis report 2021, country TB profile

With the disparities in coverage, Angola health systems require greater investment in community-based health systems to widen access to TB testing and treatment as currently 60% of the TB services are located around Luanda, the capital city.

The country's universal health coverage and social protection rate was at 55 % which is still far from the global target of 70% set by the WHO. The 2019 cohort has recorded a treatment success rate of 69% among new and relapse cases registered in 2019.

It was noted that due to limitations in M&E system within the NTP, there is no documentation of treatment outcomes neither among previously treated cases (excluding relapse cases) nor among MDR/RR-TB cases and HIV positive TB cases of the same cohort.

3.3.2 DRC TB profile

The DRC is also amongst the 30 countries that make 87% of the global TB burden but also one of the 14 countries in the world with the combination of the highest incidence of tuberculosis (TB), multidrug-resistant (MDR) TB and TB/HIV co-infection. In 2019, 286,000 people fell ill with TB, giving an incidence of 319 cases per 100,000 population.

The incidence of TB remains unchanged over the last 2 decades while it's noted that case notification is on rise since 2015. The trend of TB incidence in the general population and among PLWH is presented on graph 3. The key indicators of TB in DRC are presented in table 2.

The country's universal health coverage and social protection rate was at 70% which complies with the global target of 70% that is set by the WHO. The 2019 cohort has recorded a treatment success rate of 92% with poor record of 71% among previously treated cases excluding relapses.

Table 2: The key TB indicators for TB burden in the DRC

Table 2:TB Burden indicators, DRC, 2022

Indicators	**per 100,000 population**
TB incidence	319
TB Prevalence	326
TB mortality	49

Source: WHO global TB report, country's estimates of TB burden in 2021

3.3.3 MADAGASCAR TB profile

Though the incidence of TB remains high in Madagascar, it has been on constant decline since 2000. The key epidemiological indicators of TB are summarized in table 2 below. The country's universal health coverage and social protection rate is lower at 59% compared with the global target of 70% that is set by the WHO.

Table 3: TB Burden indicators, Madagascar, 2022

Indicators	**per 100,000**
TB incidence	233
prevalence	238
TB mortality	44

Source: WHO global TB report, country's estimates of TB burden 2021

In 2019, Madagascar notified 3,220 cases of TB including all forms among new cases and relapses. The 2018 cohort has recorded a treatment success rate of 83% with poor record of 66% among previously treated cases excluding relapses.

3.4 EXISTENCE OF KEY DELIVERABLES AS SPECIFIED IN THE SADC DECLARATION ON TB IN THE MINES OF 2012

Member States are guided by the SADC Code of Conduct on operationalization of the 2012 TB in the Mines Declaration. The Code re-affirms MS commitment to eliminate TB in the region to improve environmental, health and safety practices and standards in the mining sector, in accordance with provisions of selected Regional and International Protocols. In line with the code, all Member States are expected to invest in the following areas:

Table 4: Existence of expected key deliverables according to the mining Code

The Code's deliverables	Angola	DRC	Madagascar
Existence of National Strategic Plans incorporating TB in the Mining sector	The National TB Strategic plan does not include TB in the mines as key component. The assessment noted that the NTP does to some extent collect data disaggregated as miners/ex-miners, through the revised TB electronic system	The Strategic Plan does not include TB in the mining sector, thus the NTP has no data on miners and ex-miners.	TB in the mines is not part of the current Strategic plan in Madagascar. The country does not consider TB in the mines as a priority.
Existence of National Task Force on Communicable diseases, Occupational Health and Mobile Populations	Although there are disease specific task teams, there are no joint task force for the above listed. Angola has a technical working group focusing on TB and this may from time to time jointly meet with the HIV TWG. Occupational Health is stand-alone and there is no involvement with mobile populations.		
Existence of independent national office for resolution of mining sector heath issues	This is governed by the ministry responsible for mining.		
Classification of TB and Silicosis acquired in the mines as occupational diseases	No classifications of silicosis or TB acquired in the mines as an occupational disease		
Existence of legislation on	No legislation on compulsory reporting of TB, Silicosis or any other		

compulsory reporting of TB, Silicosis and other occupational respiratory diseases	occupational lung diseases		
Legislation to support compensation of mineworkers and ex-mineworkers that contract an occupational disease	Yes legislation exists for compensation of mine workers contracting occupational lung diseases, however TB is not one of the compensable diseases. What should be noted is that such legislation is only for the large scale mining companies and considerations should be made for medium scale and ASMs		
Existence of minimum standards and packages for TB, HIV, Silicosis and other occupational respiratory diseases prevention, treatment, care and support	Yes there are minimum standards, however these are generalized		
National limits for cumulative exposure to silica dust; and Silica Occupational Exposure Limits (OEL) consistent with international best practice and benchmarks	Yes there are limits for cumulative exposure to silica,	Yes there are limits	There was no documentation of limits to dust exposure
Existence of integrated wellness programmes for TB, HIV, Silicosis and other occupational respiratory diseases accessible to all mineworkers and ex-mineworkers	No integrated wellness programmes		
Evidence of conduct of operational research on TB, HIV, Silicosis and other occupational respiratory	No evidence of research		

diseases	
National M & E framework for silica dust levels in the mines;	No M&E framework for silica dust levels monitoring
Evidence of Government or partner funding line items for programmatic interventions for TB, HIV, Silicosis and other occupational respiratory diseases	Only for TB and HIV
Evidence of Government or partner funding line item for compensation obligations	Yes there is evidence for Gvt and partner funding for compensation obligations, however not for TB

3.5 MINING LEGAL FRAMEWORKS IN ANGOLA, DRC AND MADAGASCAR

The mining industry is central to the economic development of Africa. Despite the great promise, the mining industry has struggled to reach its full potential tom provide economic transformation to countries that are hosts to large deposits of natural resources, a paradox of plenty. The answer is in the way the mining industries are governed by the countries, which speaks to the enactment of legal frameworks that govern the mining sector. This section of the report outlines the legal frameworks for each of the 3 countries.

The legal environment and policing on mining activities are precarious and quite inexistent. The following observations have been made:

- The mining codes exist in all 3 countries, but have not been updated for a longtime and are not followed, rather they are often violated mainly due to high corruption rate.
- The mining activities are mostly unregulated leading to huge number of companies exploiting without license
- There is a predominance of illegal activities due to significant portion of artisanal miners and diggers who are not registered.

3.5.1 Angola legal frameworks

The mining sector is primarily governed by the Mining Code, approved by means of Law 31/11, of 23 September 2011 (the Mining Code), which covers most of the rules applicable to the mining industry and mineral operations, from exploration to mining beneficiation, and the marketing of all sorts of minerals. Complementary to the rules of the Mining Code are key rules and regulations in other ancillary pieces of legislation. Many environmental policies have been enacted over the past two decades due to the threat that mining poses to ecosystems and biodiversity in many regions in the world.

3.5.2 DRC Legal frameworks

On the 10th of October 2018, a new mining code came into law. The new law was aimed at increasing royalties on copper from 2% to 3.5%, on gold from 2.5% to 3.5% and could potentially increase royalties on cobalt from 2% to 10%, if deemed a "strategic substance. Other key changes include a provision that doubles the state's free share in mining projects to 10% and a reduction on the period during which contract stability is guaranteed down to five years, from 10 years stipulated in the current mining law.

Haut - Katanga has been the selected province of destination for the baseline assessment in the DRC as it was perceived to be where there would be enough information to feed our assessment questionnaire.

3.5.3 Madagascar legal Frameworks

The present-day laws related to the mining sector in Angola that were found include:
*Act No. 2005-022 of 17 October 2005, which is an amendment to Law No. 2001-031 of 8 October 2002 and which prescribes specific rules for large investments.
**Act No. 2005-021 of 17 October 2005, which is an amendment to Law No. 99-022 of 19 August 1999; to the Mining Code and the Decree No. 2006-910 of 19 August 2006 on execution of mining Code.

3.6 STATE AND NON-STATE ACTOR ANALYSIS

Following the understanding of the scope and nature of mining communities, it was key to understand the stakeholder landscape including state and non-state actors in the mining sector to enable determination of their roles, their capacity and gaps in their respective functions. The importance of the findings on this stakeholder analysis is that it will help to define additional potential actors, their roles and responsibilities, mechanisms for collaboration in the future planning for TB response in the mining sector.

Starting from the prescribed role of NTP which is to lead the creation of a conducive and supportive environment for the setting up of workplace programs or to partner with existing workforce programs, it was noted that neither country TB program has done so, probably as a result of not having mineworkers and ex-mineworkers in the list of risk populations. And yet the risk for TB among MWs is higher than that of PLWH and close to that of prisoners who have the highest risk for TB among all populations at risk.
This section of the report outlines the partners that were found to be supporting and working with the National TB programmes and the different ministries dealing with mining activities.
Each table highlights the roles of each partner and also the gaps that were identified.

As a limitation, chambers of mines in Angola and Madagascar could not be identified, only in DRC were the Chambers interviewed. In Angola, most state and non-state actors could not be visited, therefore focus was on the NTP, Ministry of Mines in Angola.

3.6.1 Angola's partners on TB in the mining sector

The ministry of petroleum, gas and mineral resources is the government institution in charge of the mining industry in the country. A collaboration framework between this ministry and the ministry of health is in progress to find favorable ways to implement the program to combat tuberculosis in the mining sector of the country.

Table 5: Angola's partners in TB and Mining

Partners	Roles	Gaps
Ministry of labor	Not specified	Harmonization of partners roles with reference to the list of suggested partners and their roles in annex 14.3 Complete the list of partners as needed or indicated during the preparation and.
Ministry of health/ Department of occupational diseases	In charge of epidemic disease control	
Ministry of health/ National TB control program	The MoH is responsible for all TB activities in the country. Its role is ensuring availability of TB services for all populations. It ensures coordination, implementation, monitoring and evaluation of TB activities across the entire country including the mining sector.	

Mining companies	Some support the NTP in carrying out screening and diagnostic activities	development of the guidelines for multi-actor collaboration in TB control in the mining sector
Civil society organizations	Not specified	
Non-government organizations (E.g: CUAMM)	Not specified	
Ex miners and Miners associations	Advising some associates and solving the problems of former and current miners.	

3.6.2 DRC Partners in TB and Mining

Table 6: DRC's partners in TB and mining

Partners	Roles	Gaps
Ministry of labor	Its role is spelled out in the mining licenses awarded to large mining companies, which are required to abide by the labor laws in the management of their staff, with regard to fringe benefits and health cover. The Ministry of Labor is expected to carry out inspections to ensure workers' labor rights are respected.	Harmonization of partners' roles with reference to the list of suggested partners and their roles in annex X
Ministry in charge of Immigration and home affairs	The role is not ascertained although we gathered that DRC has migrant workers given the close borders it shares with countries like Uganda, Tanzania and Rwanda, notably in the large mining sites' districts.	Complete the list of partners as needed or indicated during the preparation and. development of the guidelines for multi-actor collaboration in TB control in the mining sector
Ministry of health/ National TB control program	It identifies sub-recipients to work with in rolling out the TB program nation-wide. It defines the policies and tools for data collection, sensitization protocols, TB patient screening, testing, referral and treatment processes, manages health centres and laboratories, and reports on the TB situation in the country.	

Ministry of health/ Department of occupational health	It plays a role for workers in large mining companies, but not specifically on TB. Its focuses on occupational health diseases like HIV, malaria and Covid-19.	
Mining companies	These companies have very well-structured occupational health systems, and look closely into the occupational health of all miners, including TB.	
Civil society organizations	One CSO met is called LNAC (Ligue National de la lutte anti tuberculeuse et anti lepreuse de Congo) which has a broader mission of conducting community and outreach advocacy for TB including the mines surrounding communities but with no specific target on TB.	

3.6.3 Madagascar Partners in TB and Mining

Table 7: Madagascar partners in TB and Mining

Partners	Roles	Gaps
Ministry of labour	No specific role so far identified	Harmonization of partners roles with reference to the list of suggested partners and their roles in annex 14.3 Complete the list of partners as needed or indicated during the preparation and. development of the guidelines for multi-actor collaboration in TB control
Ministry of health/ National TB control program	It identifies sub-recipients to work with in rolling out the TB program nation-wide. It defines the policies and tools for data collection, sensitization protocols, TB patient screening, testing, referral and treatment processes, manages health centres and laboratories, and reports on the TB situation in the country.	
Ministry of health/ Department of occupational health	No specific role so far identified in TB response in the mines	

Mining companies	No specific role spelt out in regard to TB response in mine workers and their families. However, 2 private and 1 state-owned companies have been identified with well-structured occupational health systems, and closely looking into the occupational health of all miners, including TB. QMM, one of the largest private mining companies have clearly developed or operational TB protocols for its miners, from sensitization to raise awareness on TB, to screening, testing and access to treatment. The company has a strong safety culture in and around the mines.	in the mining sector
Civil society organizations	No one was met. There is no specific role defined for mining companies	
Non-government organizations	Non-government organisations work in close collaboration with the Ministry of Health's NTP Coordination team. The two we interviewed are faith-based organisations, EKAR (Catholic) and SAF (Protestant). Essentially, their roles are to sensitise miners and the communities living around the mines; to refer suspected cases to the district health centres; to ensure miners' access to treatment via community workers; and to follow up patient treatment by tracing irregular and missing cases. They collect data which they share with the NTP coordination team.	
Miners' association	One Miners' association whose role is essentially to regroup illegal miners under an umbrella to obtain mining licenses from the Ministry of Mines, but also to advocate for better living and working conditions for small artisanal miners.	

3.7 COMMITMENT OF THE MINING COMPANIES TO MWS SAFETY AND WELLNESS

Existing interventions	Gaps
Industrial mining companies with regulations provide health care in their owned health facilities/clinics (examples, in Madagascar: the the Rio Tinto company, in Angola: diamond company Catoca, in the DRC: Kamoto Copper Company, Alliance, Mutanda & Katanga Mining, SA Mining Company)	Provision of health care in ASM remains poor and unregulated living their workers with only option for public facilities which are difficult to access due to long distances they have to travel to reach them
Existence of an insurance scheme for MW in industrial mining companies	Individual expenditures on other TB related cost like transport and further examinations on the patient's wallet
	No health insurance coverage for ASM

3.8 ADVOCACY, EDUCATION AND SOCIAL PROTECTION

Advocacy for return-to-work policy is essential to deal with anxiety associated with absence from work during TB treatment and before TB patients stop being infectious. Due to the high vulnerability status of MWs, it's essential to ensure and beep up a return-to-work policy for them while linking it to medical certification that MW is no longer infectious. This will enhance, though not enough alone, protection from social vulnerability for MWs and their families (mostly their dependents).

Regarding the advocacy and social protection, only in DRC we found the labor law provision allowing any TB patient regardless of his/her working sector a compensation in case evidence is provided that the current episode of TB is occupation related.

The following table highlights which interventions are available and the gaps in terms of advocacy and social protection.

Table 8: Strengths and Gaps in advocacy and social protection in mining sector

Existing interventions	Gaps
- Existence of return-to-work policy in the mining workplace policy? - Paid sick leave in industrial mining companies	- MWs and staff education that TB is curable - High stigma level for all communicable diseases TB and HIV leading to high number of underreported cases - No financial compensation to any MWs (neither in industrial companies nor in ASM) - MWs in ASM grouped in cooperatives are not protected (they hide TB, get sucked off after a period of illness.)

In terms of IEC, we noted that NTPs across the 3 countries implement an IEC plan through supervisions to health facilities and outreach activities to communities to raise awareness of patients and communities in general, but we could not ascertain how this plan benefits mineworker's population in particular.

3.9 DESCRIPTION OF EXISTING TB CARE, PREVENTION AND TREATMENT SERVICES IN MINING COMMUNITIES

While countries are encouraged to implement a community service delivery package that is consistent with WHO recommendations, a community-based assessment in true sense has not been possible due to long distances between the capital city and mining sites. Information provided herein under is from our key respondents while noting that desk review could not provide significant data due to paucity or to an extent the inexistence of data on TB in MWs and mining communities.

While anticipating the need of strengthening and mainstreaming mining companies' TB/HIV activities (for those which has their own health facilities and currently doing activities in this area), it remains essential to keep in mind that their integration should build on the existing mechanisms rather than creating a vertical or a duplicate mechanism to what exists.

It was noted that the framework of harmonized management of TB in the mining sector encourages to integrate workplace TB policy in broader policy in case they exist (e.g., workplace HIV policy, OHS policy).
If any workplace OHS policy exists, or in process of approval or there is a statement of commitment in any of these 3 countries, it's essential to address the following principles of the ILO Code of Practice & Occupational Disease list (2020):

- Recognition of TB and HIV as workplace issues

- Bipartite approach (working with management and works representatives)
- Gender equality
- Protection of the. Rights of workers
- Non-discrimination
- Continuation of employment.
- Prevention, treatment, care and support

Though there is not yet a plan for TB in the mines, but being aware there are HIV program activities going on in the mining companies and sites in parallel with COVID-19 or other epidemics; the following elements linked to prevention, diagnosis, treatment, care and support were assessed to ascertain alignment to WHO recommendations:

3.10 STRENGTH AND GAPS IN TB, TB/HIV INTERVENTIONS IN MINING

Table 9: Strengths and Gaps in TB/HIV interventions in relation to mining

Strengths	Gaps
Managerial level	
In the DRC, it was noted that large mining companies with own dedicated health services do provide TB/HIV services, mostly spearheaded by TB/HIV programs	• There is no TB/HIV policy at mine sites, in MWs families and mining communities • Large mining companies' hospitals are not accredited as TB diagnostic and treatment facilities • Lack of regulation and monitoring of TB/HIV activities • Weak ownership of government public health institutions on the few existing TB/interventions
HIV activities are integrated in OSH/HSE programs of the ministries of mines in Madagascar and DRC	
Prevention (Active Case Finding and diagnosis)	
TB screening is done when MWs develop symptoms and diagnosis can be done at company's hospital or	There is no pre-enrolment screening, periodic screening during employment and post-employment neither in industrial mining companies which are better regulated nor

clinic in case of industrial mining business (e.g., some companies in DRC have procured their own GenXpert machine)	in ASM.
Referral of MW with TB symptoms in their communities	
CHWS are involved in treatment follow up of TB patients without segregation of their working sector. There is a difference in the implementation model	ASM with no on-site health care facility also lack strong referral system, though few patients may be randomly referred, there is no tracking and recording mechanism[4]
Treatment	
HIV and TB treatments are provided according to national guidelines. TB treatment is provided in accredited treatment centers where quality drugs are procured through national PSM	Artisanal miners are referred to public hospitals for TB diagnosis only when they are seriously sick
Care and support for treatment adherence	
Food support may be provided as per the national management guidelines for TB which is limited to the intensive of TB treatment.	A part from TB drugs that are free, other services connected to TB treatment are paid on MW's pocket, there is compensation of transport fare to health facilities for medical evaluations
Provision of counseling by medical and paramedical staff of the mining companies' clinic	There is no compensation for loss of job
DOT	
Treatment follow up at community level is done by CHWs for ALL TB	

[4] While it has been found that ASM companies do not have on-site or owned health facility, we essentially emphasize that referral mechanisms are critical to boost case referral in the mining sector, while enabling the tracking mechanism of all referrals from small companies will contribute to high treatment coverage rate and mitigate the impact of TB burden in the mining companies and communities.

patients as per the national guidelines for the management of TB, without distinction on patient's occupation, both in DRC and Madagascar.	

In regard to treatment follow-up of TB patients at community level, approaches differ across countries where as:

- In Madagascar, it is uniquely done through NGOs like EKAR, SAF which are present in all regions and CHWS are well linked to these NGOs (among activities of these NGO: trainings of CHWs, monitoring of their activities with appropriate tools designed by the NTP, reporting to TB regional coordination teams, community sensitization, etc).

NTP regularly supervises these NGOs as their sub-recipients, otherwise they are SSR to the PR.

- In DRC, it's rather a government organization called CIELS which is focused on HIV/TB/Malaria and COVID 19 in industrial mining sector. It has a wide experience in HIV program implementation in the mining sector and has started TB screening among HIV patients in the mine sites as part of the TB/HIV collaborative activities. They are connected to 65 artisanal mining sites as well as to industrial mining companies which is a huge opportunity to start an effective TB project in the mining sector including referral of presumptive cases to facilities that have rapid molecular testing, notification of cases to the NTP, monitoring the trend of TB in the mining sector, etc.

We don't know the extent of its capacity to do this job in such a way to cover all province mining sites. This could be an area of future TA that will aim at assessing the needs to fully operationalize such an organization to run a much more effective TB project in the mining sector.

- In Angola, it's a private mining company called Catoca that has contributed to this recognizable performance in TB case notification in the province of Lunda Sul through the last 3 years due to a well-organized TB service network which caters for TB care and treatment needs of its staff and their families.

3.11 MONITORING & EVALUATION SYSTEMS

From a management level point of view, currently the NTP M&E system has not set up a mechanism to collect and notify data on TB among MWs. However, while awaiting the revision of the program's M&E tools, some insufficiencies are noted to indicate some priority elements to consider at the time of developing national protocols for TB management in mineworkers and their communities.

Table 10: Strengths and gaps in M&E systems for TB in the mines

M&E for TB program in the mining sector	
Strengths	**Gaps**
Existence of health data for MWs in industrial mining sector	Scarcity of health data for MWs and ex-miners. No data for ASMs
Existence of TB data disaggregated for MWs from 9 of 18 provinces in Angola Both MWs in industrial and ASM consult public health facilities in which case data on TB can flow up through the TB program M&E system in an aggregated manner	Existing M&E tools are not tailored to MWs' need yet as TB in the mining sector was not yet given due attention in the TB NSP. Only in Angola were tools revised to capture miners and ex-miners
	TB data from private owned-companies do not flow up into TB program M&E systems as a result of lack of recording tools and training on TB guidelines for companies' managers and healthcare professionals.
	As far as TB is concerned in CHWs activities and being monitored by either NGO (e.g. EKAR in Madagascar) or government organizations (e.g. CIELS in DRC), data on TB are reported on population basis, with no segregation by MW profession at this time.
	There is no plan for TB control activities in the mining sector neither in the TB NSP nor in a specific stakeholder's plan for health activities in the mining sector (e.g. CIELS, industrial mining company, CSO like LNAC, etc)

3.12 INFECTION PREVENTION AND CONTROL

At this point, we don't have basis of ascertaining quality of infection control in mining sites and communities of MWs as we have not traveled to any site, but from a statement generally accepted that working and living environments for MWs are usually characterized by poor ventilation and overcrowding, there is increased risk of TB transmission among MWs, their family members and close contacts.

The following administrative elements for an infection control program in the context of the mines have been assessed as we discussed with companies' managers, HSE officials and TB program managers or TB/HIV focal persons
Environment measures in the mining workplaces as well as in the community could not be ascertained as it requires onsite verification.

Table 11: Strengths and gaps in Infection, Prevention and Control for TB in mines

Managerial level	
Strengths	**Gaps**
Application of HSE regulations and monitoring of HSE standards in industrial sector	Where TB IPC package exists, it's mostly driven by the HSE department under the MM to foster occupational health regulations in the mining sites rather than by the occupational health department of the MoH or the NTP There is no IPC plan for mining workplaces and living places that is coordinated It's not sure whether the minimum package of TB IC activities is implemented in mining sites and mining companies that offer TB/HIV services
	Lack of HSE standard in ASM
	There would be no such a particular policy on HIV testing among MWs given that this population is not highlighted yet as risk population in the TB NSP

	Prompt identification of potentially infectious cases and separating them from other MWs until confirmed non-infectious is not performed
	Training for administrators and HCWs in companies' clinics not conducted
Personal respiratory protection	
Standard PPE are provided by hospitals or clinics in private-owned mining companies	There is no ordinary mask (surgical mask or tissue) even provided to artisanal mines and yet they are the most exposed as they operate in undergrounds pits

3.13 INH PROPHYLAXIS AS ONE OF THE 3" IS" OF IPC

MWs are recognized as high-risk group based on the high prevalence of latent TB infection up to 89 percent (1), high prevalence of HIV infection (2) and a consequently estimated 10 times higher TB incidence (3) than in the population they originate.
Individual level effect of IPT on TB prevention as clearly demonstrated in the Thibela study (4), encourages NTP and OHS to promote access of MWs to IPT as part of the holistic approach including intensified TB screening and infection control.

3.14 GAPS AND ACTIONS BY STRATEGIC ORIENTATIONS FOR TB CONTROL IN THE MINING SECTOR

It's anticipated that country's capacity to respond to TB in the mining sector will rely on a clear strategy that refers to the SADC code of conduct strategic objectives and actions.
Therefore, priority was given to identification of key programmatic gaps in addressing TB, TB and HIV, silicosis and other respiratory communicable diseases which would in a sequential manner facilitate in the formulation of strategic interventions and catalytic actions to curve the burden of TB in the mining sector, in a form of a specific guidance document.

Table 12: Strengths and actions by strategic intervention

Strategic orientations	Gaps in actions

Strengthening Accountability, Coordination and Collaboration for TB, TB and HIV, Silicosis and other occupational respiratory diseases control in the mining sector at national and regional levels	- Absence of a framework for coordination of TB, TB/HIV and other occupational respiratory diseases - Lack of harmonization of stakeholders' roles and identification of their capacities Upon the establishment of national coordination and collaboration frameworks, and national strategy for TB control in the mining sector, the following are not in place: ● Lack of linkage to existing African bodies for oversight on the future national plans for TB and other respiratory occupational diseases ● National mechanism to facilitate resolution of complaints related health issues in the mining sector
Promoting a supportive policy and legislative environment for TB, TB and. HIV, silicosis and other occupational respiratory diseases	- TB is not in the list of occupational diseases as prescribed by the international labor organization and in line provisions of the SADC Declaration, creating an environment that doesn't support compensation of mineworkers and ex-MWs that contract TB or silicosis at workplaces - TB cases not being notified to NTP makes difficult its compulsory reporting including other occupational respiratory diseases, in a confidential and non-discriminatory manner. - Lack of TB and TB/HIV policy that is consistent with SADC minimum standards and international practices - Lack of provision of housing in the mining sector - Lack of guidelines for limitation of silica occupational cumulative exposure with international conventions and international best practices.
Strengthening Programmatic interventions for TB, TB and HIV, Silicosis and other occupational respiratory diseases control in the mining sector	- There is no wellness programs for workplaces (mining sites, miner's households and communities) for employers to take responsibility on management of TB and other occupational respiratory cases - There is neither plan nor budget for operational research to support evidence-based programming of TB, TB/HIV and ORD in the mining sector - Contingent to lack of a TB strategy for the mining sector, there is no community mobilization programs in the mining communities.

Strengthening disease surveillance system for TB, TB and HIV, Silicosis and other occupational respiratory diseases Control in the Mining Sector	- Lack of mining sector, gender disaggregated data on TB and TB/HIV
Integrating in the programs (NTP and NAP) M&E indicators for TB, TB/HIV and silicosis in the mining sector	- Lack of minimum package of TB interventions and their indicators in the M&E framework on the TB NSP

3.15 TB DATA IN THE MINING SECTOR

As already said before, one of the key limitations in this baseline assessment was the scarcity of data on TB among mineworkers and their communities in most cases. It is only in Angola we could obtain some key data and facts related to TB in the mines from the presentation made by the NTP manager during the high-level engagement meeting with stakeholders.

3.15.1 TB in the mining sector in Angola

In 2019, TB data collection instruments underwent a review which allowed data disaggregation into various target populations (health professionals, prisoners, miners, etc).
Since 2019, the year of updating the data collection forms, only 9 provinces have reported cases of TB diagnosed in miners: Bié, Cuando - Cubango, Huambo, Huíla, Luanda, Lunda Norte, Lunda Sul, Moxico and Zaíre. Among the provinces with cases of TB in miners, the highest number of cases was registered in the province of Lunda Sul throughout the last 3 years. A private mining company called Catoca has contributed to this recognizable performance in TB case notification in this province due to a well-organized TB service network which caters for TB care and treatment needs of its staff and their families. Table 3 shows numbers of TB cases notified in the 9 reporting provinces by year, between 2019 and 2022.

Angola has 18 provinces and each with mining activities. This only represents 50% of country coverage in TB case reporting among mineworkers.

However, these low figures would align with a strong presumption of (a) lack of a clear map of mining sites in these 9 provinces so far reporting and beyond them, just like in other countries which actually could not provide such a kind of disaggregated TB data across key populations, (b) absence or precarity of M&E system targeting mineworkers among other key populations. It is therefore worth strongly recognizing the efforts made by MoH/NTP of Angola to get to this level which provides baseline data we can leverage to improve TB control in the mining sector and even take lessons from to improve M&E systems both in Angola and the other countries.

Table 13:TB case notification among mine workers and ex-mineworkers in Angola,

	Provinces									Total TB cases among MWs
Years	Bié	Cuando Cubang	Huamb	Hulia	Luanda	Lunda Norte	Lunda Sul	Moxico	Zaire	
2019	0	0	0	1	1	5	24	3	2	36
2020	0	0	0	0	0	2	33	0	0	35
2021	1	0	0	0	0	6	35	0	1	43
2022 *	0	9	1	0	0	1	36	0	0	47

* 2022: Data for first semester

In all the 3 countries assessed, TB response in the mining sector is jeopardized by obvious facts like the lack of data on TB and other lung diseases, the perception of mining activities as an exclusive business of the ministry of mines that creates the gap in collaboration between the ministry of mines and the ministry of health and therefore seriously hampering the promotion of health standard in this vulnerable population[5].

3.16 ADDITIONAL INFORMATION ON SCOPE AND NATURE OF MINING COMPANIES

Table 14: Additional information for TB and mining in the 3 countries

Assessment area	**Description**
Population of the community	Though we have rough estimates, the exact number of mine workers is unknown in all 3 countries, due to several factors: lack of mapping for mine sites, the migratory nature of illegal miners, institutional capacity to

[5] During an interview with ministry of health in June 2022: "According to the ministry, TB and other lung-related diseases have a very low prevalence rate and are therefore not a focus in its HSE activities"; "occupational health has not yet been perceived as a priority in the mining sector".

	do the mapping (human resources, tools, resources), illegal employment arrangements, etc.
Number of MW and ex-MW in the community	In Lubumbashi, estimates indicated there are about 45,000 artisanal miners with the biggest mining site having itself at least 22,000. These numbers exclude the communities (families) which are deemed to be larger. Due to migratory, seasonal nature and illegal character of mining activities, it's had to get figures with higher precision levels. Currently, there are efforts in countries to review the mining codes while taking actions to get mapping of all mining sites. This is supported, e.g., in the DRC by SAEMAPE which is a government institution that supports the artisanal miners to get registered and obtain cards as registered diggers through their cooperatives. According to data we had access to that are not exhaustive, the miner work population would be around 14,685 and yet requires an exhaustive work and consultation with institutional partners to get more precise and updated figures. Of the above indicated figure, there are 14,118 nationals and 667 foreigners representing 4.7 %.
TB/HIV burden among mine and ex-mine workers	No data exist on TB for MW as tools for M&E currently in use do not collect them in disaggregated way, both for TB and HIV programs
Availability of general health and TB services	- Existence of built-in hospitals and clinics in industrial sector - Auto medication in ASM due to high level of poverty - Free TB care for all as provided by the national TB program - Hard access to health care facilities for ASM
Availability of CBO	Community based management of diseases including TB, HIV is not functional in the mine's workplaces
CSO and NGO active in the community	There are NGO that are engaged in TB control activities with outreach to communities but with no emphasis in the mines and mineworkers in their plan of actions. Names of specific NGOs with their scope of work are spelt out in the country's specific reports
Companies' associations	Existence of cooperatives (e.g., SAEMAPE in the DRC) that assist in mapping artisanal miners, regularization of ASM activities with registration of small companies, legalization of miner's status and work license.

4 CONCLUSIONS

The paucity of health care services for the MWs and the difficulties they are facing in accessing them largely as a result of frequent migratory movements across national and transnational borders, the informal employment arrangement, the unperceived risk of TB among MWs and the unrecognition of TB as an occupational disease where its inadvertently lodged known as the HSE department of ministry of mines, the lack of a collaboration framework between the MM and the MOH, the non-integration of MWs as a priority group in the TB NSP, have mainly led to serious lack of data on TB among MWs in the 3 countries.

However, this baseline assessment indicates that the existing opportunities like the partnership with government and non-government organizations, HIV programs, inter-governmental organizations, multi-lateral donors can be leveraged to fully integrate the mining sector in the national TB control strategy and optimal output and outcomes can be expected if TIMS project is implemented and monitor through an effective collaboration framework including key ministries in charge of mines, health and social wellbeing, labour, internal affairs and security.

This is quite a new approach as recognition of MWs as a vulnerable population to TB/HIV that came up around the last 10 years, necessitates a paradigm shift in the MoH/TB planning approach which does not have to leave any one behind to end the TB epidemics and which will absolutely require an effective TA to determine the needs for the approach and define a clear roadmap and budget for TB control in the mining sector.

We also highlight one key resolution from that high-level meeting saying the composition of the TWG that brings together key stakeholders and their respective focal points who will coordinate and implement TIMS III will depend on country's specific context with respect to gender balance and policy.

In view of the multisectoral working mechanism required for the implementation of the TIMS III project, a basic composition of the TWG was prescribed as follows:

1. Ministry of Health: PNCT
2. Ministries of Petroleum, Gas and Mineral Resources: Directorate of Mineral Resources
3. Ministry of Labor and Social Security
4. Entity responsible for Occupational Health
5. Ministry of the Family, Women and Social Assistance
6. Workers' Compensation Fund
7. Key Populations (Miners' Associations, Former Miners, Women in association in the Mines)
8. Mining Companies
9. Civil Society Organizations with activities in favor of the fight against Tuberculosis in mining areas
10. Specialists in Monitoring and Evaluation, preferably those from the Ministry of Health
11. Media (Social Communication)

5 RECOMMENDATIONS

1. Hold a national dialog including key players: ministries of in health, labor, population, environment, international affairs and security, and planning to define a multi-sectoral collaboration agenda that will address the challenges in the mining sector particularly the access to health care, rights awareness and promotion, children's protection and social protection.
    i. Set up a TB control agenda (with budget, M&E plan and timeline) through the above multi-sectoral collaboration framework
2. Accelerate the implementation of TB in the mining sector through existing partnership and stakeholders (e.g., CIELS in DRC, Ministry of Mines/HSE department in Madagascar) which already are focusing on HIV/malaria and COVID under the leadership role of the MoH and NTPs.
3. The existence of protentional government (CIELS in DRC, Ministry of Mines/HSE department in Madagascar) and non-government and civil society organizations (LNAC in DRC, EKAR and SAF in Madagascar) should be leveraged to start up effectively TB project in the mining sector, NTPs should start discussion with the CCM to rise this CSO/NGO/GO as SR or SSR to the GF based on the outcome of their edibility assessment.
4. NTP should plan, budget and organize trainings on TB guidelines for mining companies' managers and health care professionals including CSO/NGO/GO which will play a pivotal in monitoring implementation of TB project in the mining sector.
5. Secure funds for an international technical support to develop a harmonized multi-actor integrated TB response plan in the mining sector, its implementation plan and review the plan annually.
6. NTP should prioritize mine workers as a risk group in the next strategic planning cycle and make an estimate of the cost to address TB in the mining sector in regards of prevention, care and treatment activities involving communities, civil society organization, private providers and other public providers. First step is to ensure these key population are part and parcel of the national TB strategy.
7. The NTP M&E system and tools should at the first revision opportunity include MM as a risk group category beside the already known like prisoners, etc. ECSA-HC as PR should support revision of national data collection tools and sure that key populations are factored in
8. Other recommendations are country specific and should be found in the country's respective reports
9. Countries to be supported in development of an M&E framework for monitoring Silica dust levels. ECSA-HC to support development of a generic Silica dust M&E framework

10. The information generated from this baseline should prompt the mobilization of technical and financial resources to develop country's harmonized and budgeted policy and implementation document of TB and HIV service package in the mining companies, mineworkers, ex mineworkers and communities.
11. TB and HIV programs should facilitate mining companies that have their own dedicated health services to set up their own workplace TB and TB/HIV programs while improving the integration and collaboration of the HSE program of the MM with the 2 programs.
12. Advocate for inclusion of Angola and DRC in the Cross-border Referral System. These countries share borders with a number of the other CBRS project countries.
13. Conduct mapping of mines in the 3 countries. there should be focus on mapping of small scale and ASM.
14. NTP should be part of the team supporting supportive supervision/mine inspection of mines. This should be done jointly with the Ministry of labour, mines and occupational health.
15. Advocate/promote cross border meetings between DRC and Angola anf their neighboring states.

6 List of potential partners in the planning and implementation of TB/HIV workplace programs in the mines.

Titles	Roles
Mine companies	Provision of TB and HIV services to their workers
	Development of an appropriate workplace policy
	Ensuring that no employee experiences discrimination on the basis of their HIV status, whether in terms of continuing employment relationship or access to health insurance, occupational safety and health care schemes
Trade unions	Mobilizing broad membership to address TB and HIV
	Creating awareness among employers and workers
	Negotiating and shaping the right workplace policies and plans
	Building support among workers for implementation workplace TB and HIV program activities
	Protecting the rights of workers
	Advocating in the political arena
	Helping build informal workers' through education, training and collaboration
	Working with NGOs and other unions to spread awareness messages to the surrounding community; add resources, share ideas, experiences and knowledge and coordinate strategies
Ministry of Labor	Advising on legal and policy reform
	Integrating TB and HIV in existing occupational safety and health structures, including labor inspection
	Providing policy guidance and practical measures to extend social protection, and advising on the development of innovative health and life insurance schemes
	Advocating for the workplace. To be the key delivery point for prevention, treatment and. care to workers
Employers' organizations	Initiating and fostering NTP-NAP business sector collaboration
	Facilitating communication with and support to the NTP and NAP staff to work effectively with the business sector
	Assisting companies to formulate, implement and monitor TB and HIV workplace policeis and programs
	Facilitate training by NTP and NAP

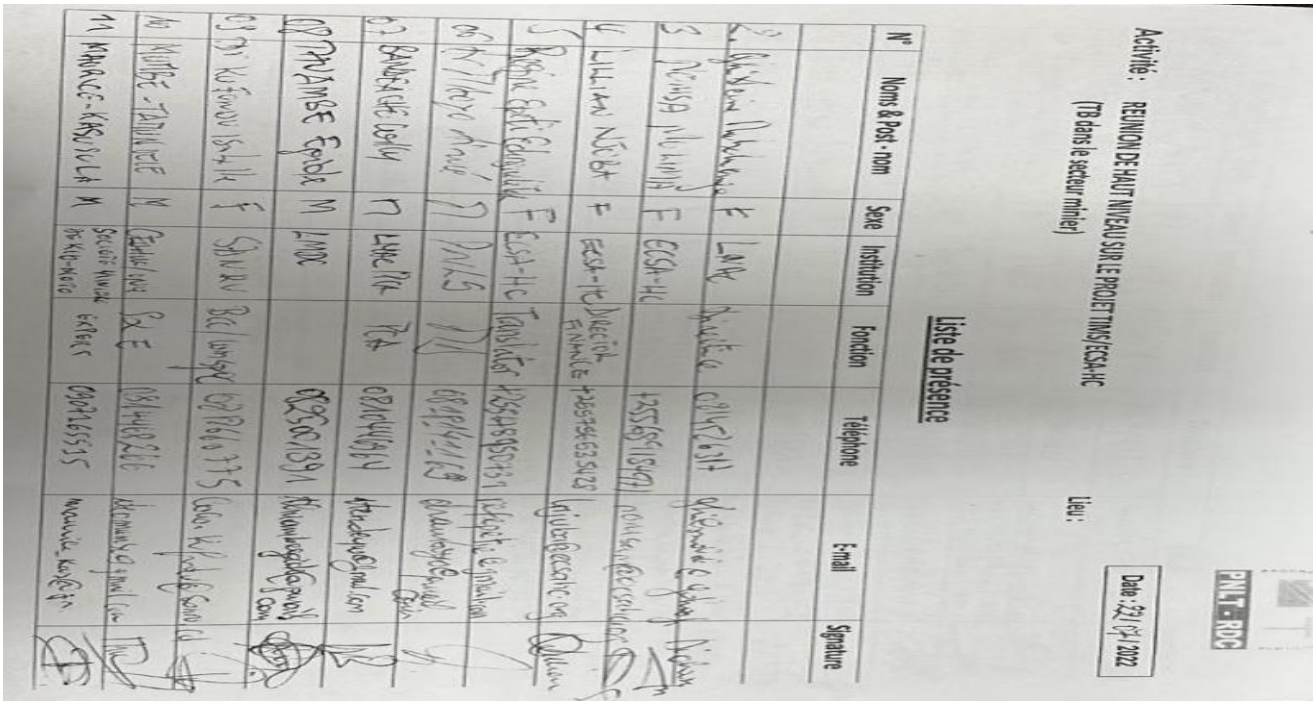
	Organize MSEs and the informal sector to build their capacity to participate in TB and HIV prevention, treatment and care activities for workers and motivate and support those with existing HIV interventions to integrate TB care and control
Companies' associations	Advocate for business action through the fostering of NTP-NAP business sector collaboration and public private partnership
	Supporting design, development and implementation of workplace programs by sharing best practices and providing necessary tools and training material
	Facilitating training by NTP and NAP
	Organize SMEs and the informal sector to participate in TB and HIV prevention, treatment and care activities for workers
	Motivate and support those with existing HIV interventions to integrate TB prevention, treatment and care
	Accrediting companies with effective workplace programs
ILO, WHO, UNAIDS	Provide technical support for the development of TB and HIV workplace policies and program, including training assistance to all companies and partners identified
	Brokering partnerships between workers demanding better working conditions and health services, and employees trying to keep costs to a minimum
NGO	Advocating and fostering NTP-NAP business sector collaboration
	Facilitating communication with and supporting NTP and NAP staff to work effectively with the business sector
	Raising awareness among all levels of management and workers
	Assisting NTPs an NAPs to train company employees, especially heath care professionals and members of trade unions
	Organize SMEs and the informal sector to participate in TB and HIV prevention, treatment and care activities for workers: assist those with existing HV interventions to integrate TB prevention, treatment and care
	Support monitoring and evaluation activities
	Facilitating community outreach

7 REFERENCES

i. A framework for the harmonized management tuberculosis in the mining sector, march 2014
ii. Tuberculosis among southern African mineworkers, the world bank report, March 2014
iii. Code of conduct on TB in the mining sector, SADC secretariat, January 2015
iv. TB in the mining sector, developing a successful advocacy plan.
v. Micro-planification de la mise en œuvre de la sensibilisation et dépistage de la Tuberculose dans les CDT.
vi. EKAR, outil de collecte de données de la tuberculose dans la communauté par le biais des services itinérants et de proximité destinée aux mineurs, NMF 3
vii. TB NSP of Madagascar 2020 – 2024
viii. TB NSP of DRC 2018 - 2022

8 ANNEXES

8.1 ATTENDANCE LIST FOR ECSA-HC /TIMS MISSION IN DRC



Activité : REUNION DE HAUT NIVEAU SUR LE PROJET TIMS/ECSA-HC
(TB dans le secteur minier)

Date : 23/ 09/ 2022

Lieu :

PNLT - RDC

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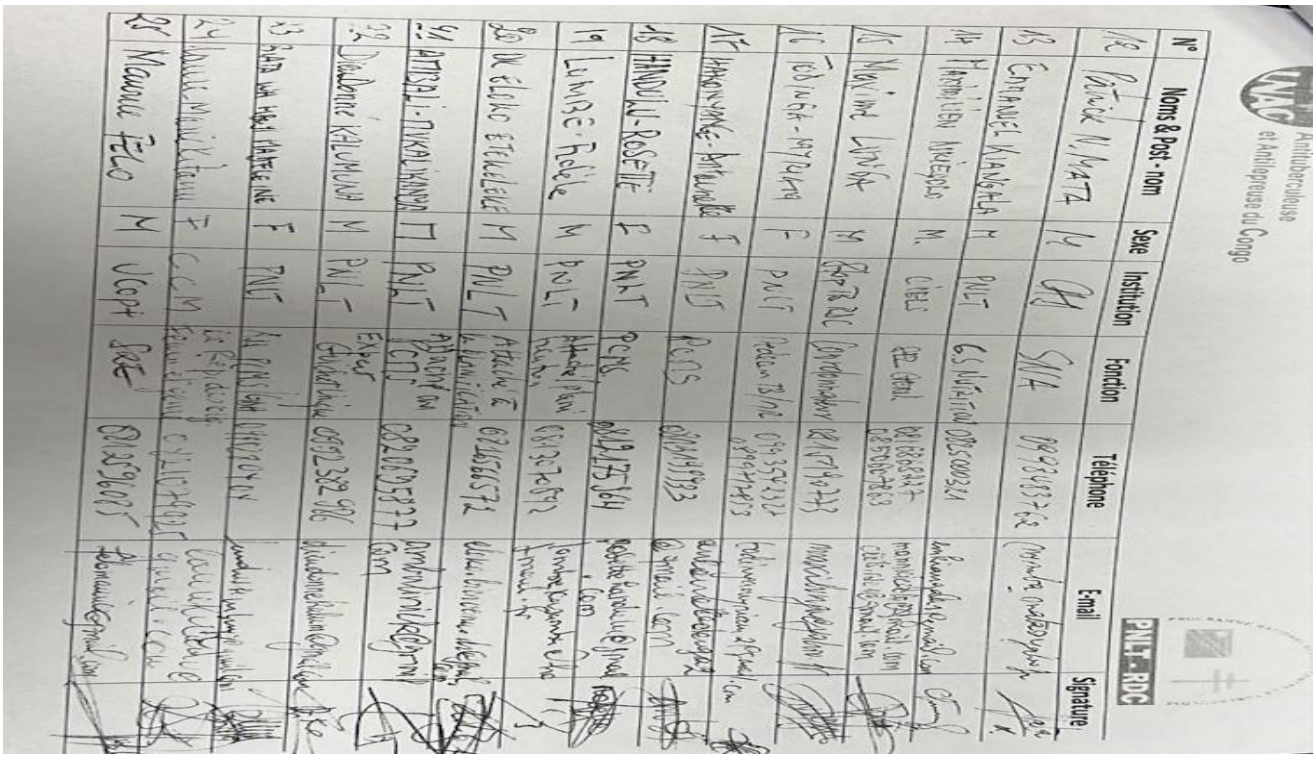

Antituberculeuse
et Antilepreuse du Congo

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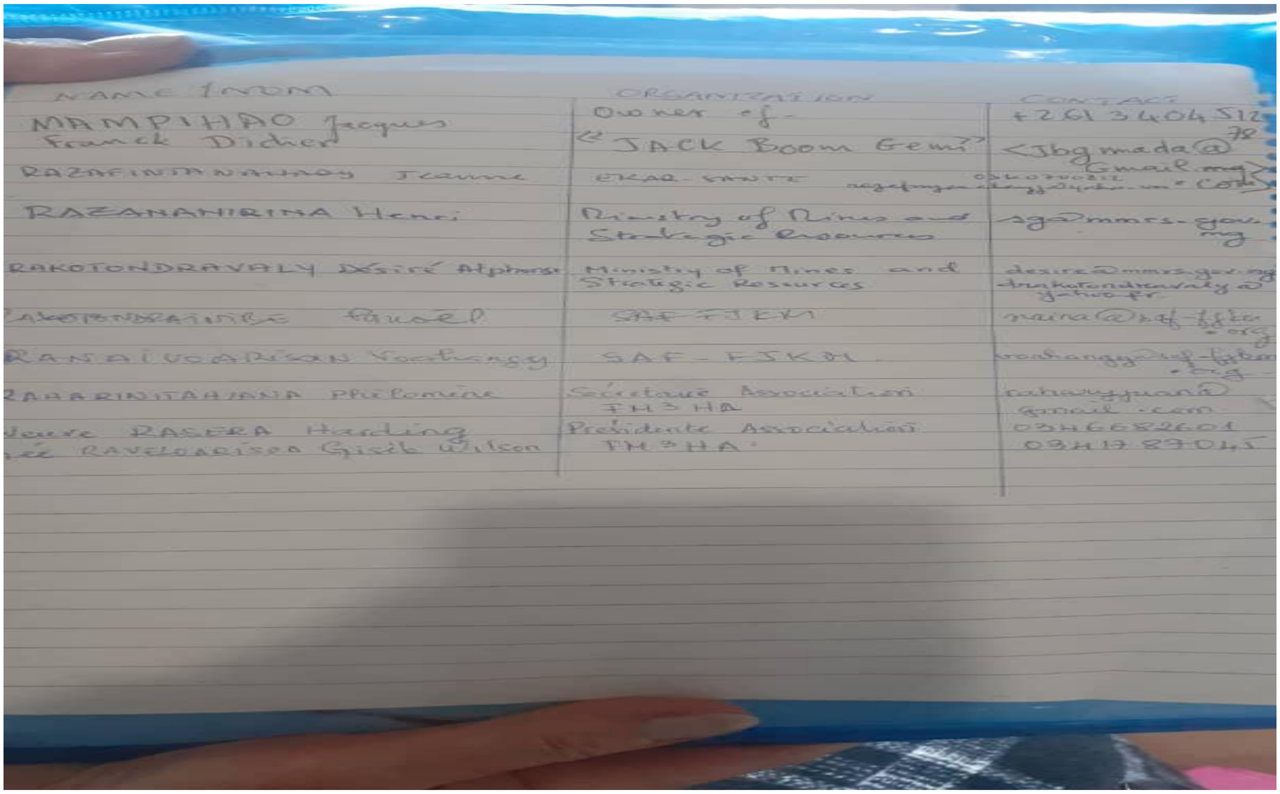
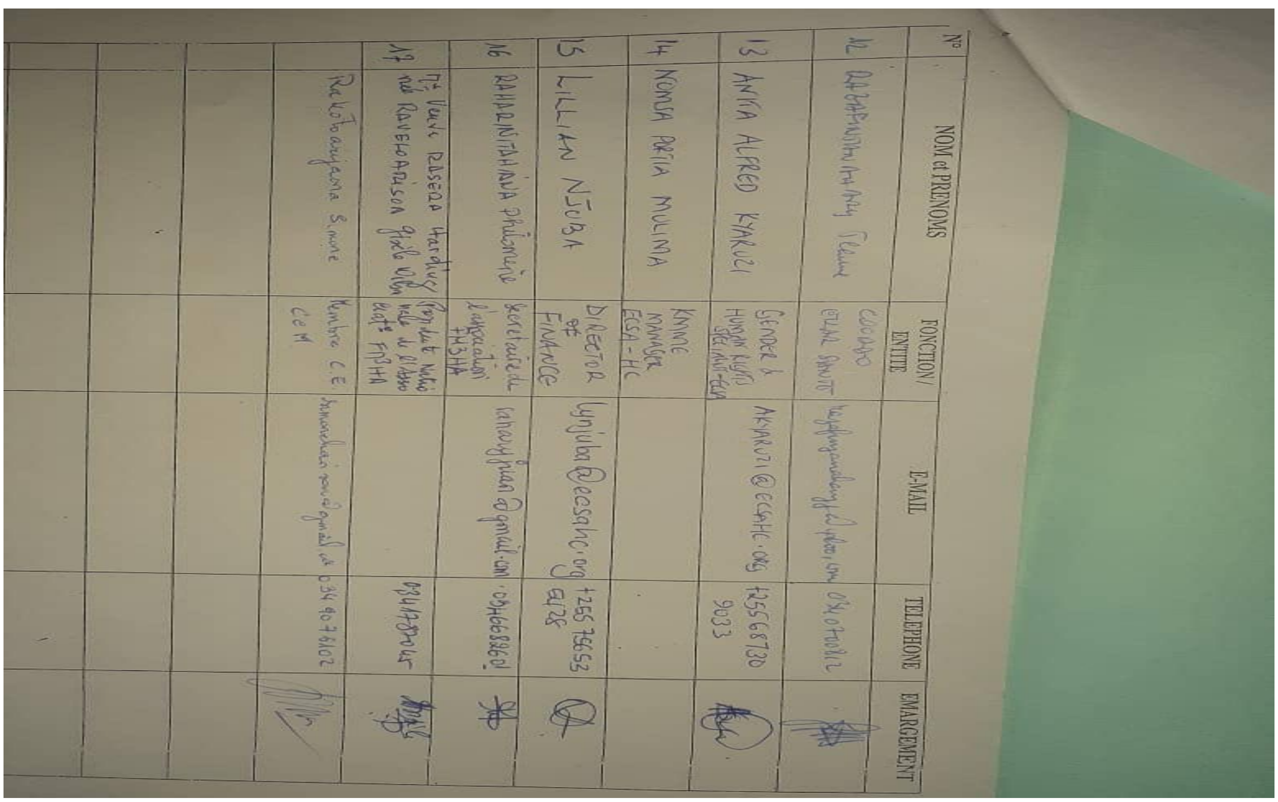
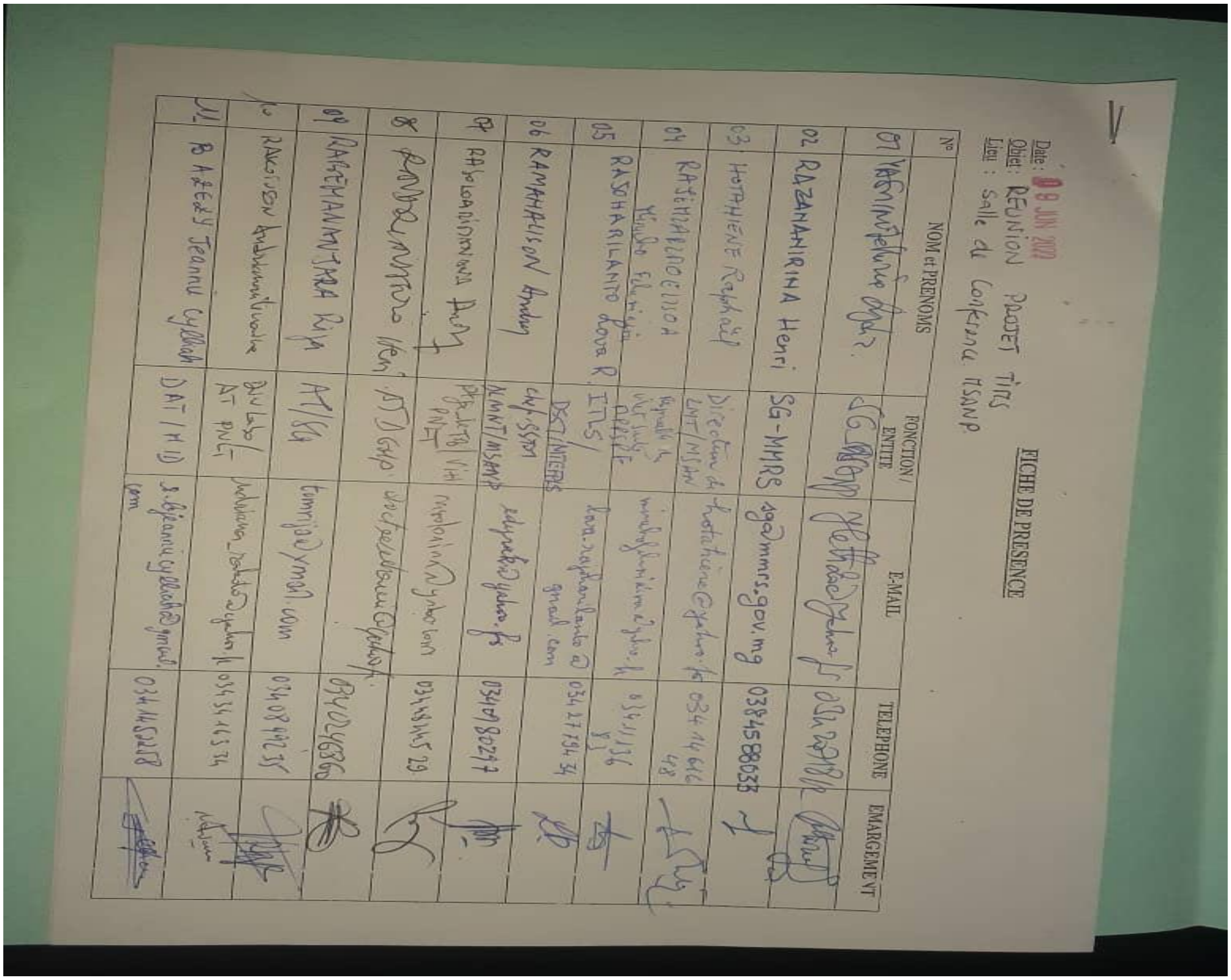
8.2 ATTENDANCE LIST FOR ECSA-HC /TIMS MISSION IN MADAGASCAR






Date : 09 JUN 2022

Objet : REUNION PROJET TIRS

Lieu : Salle de Conférence MSANP

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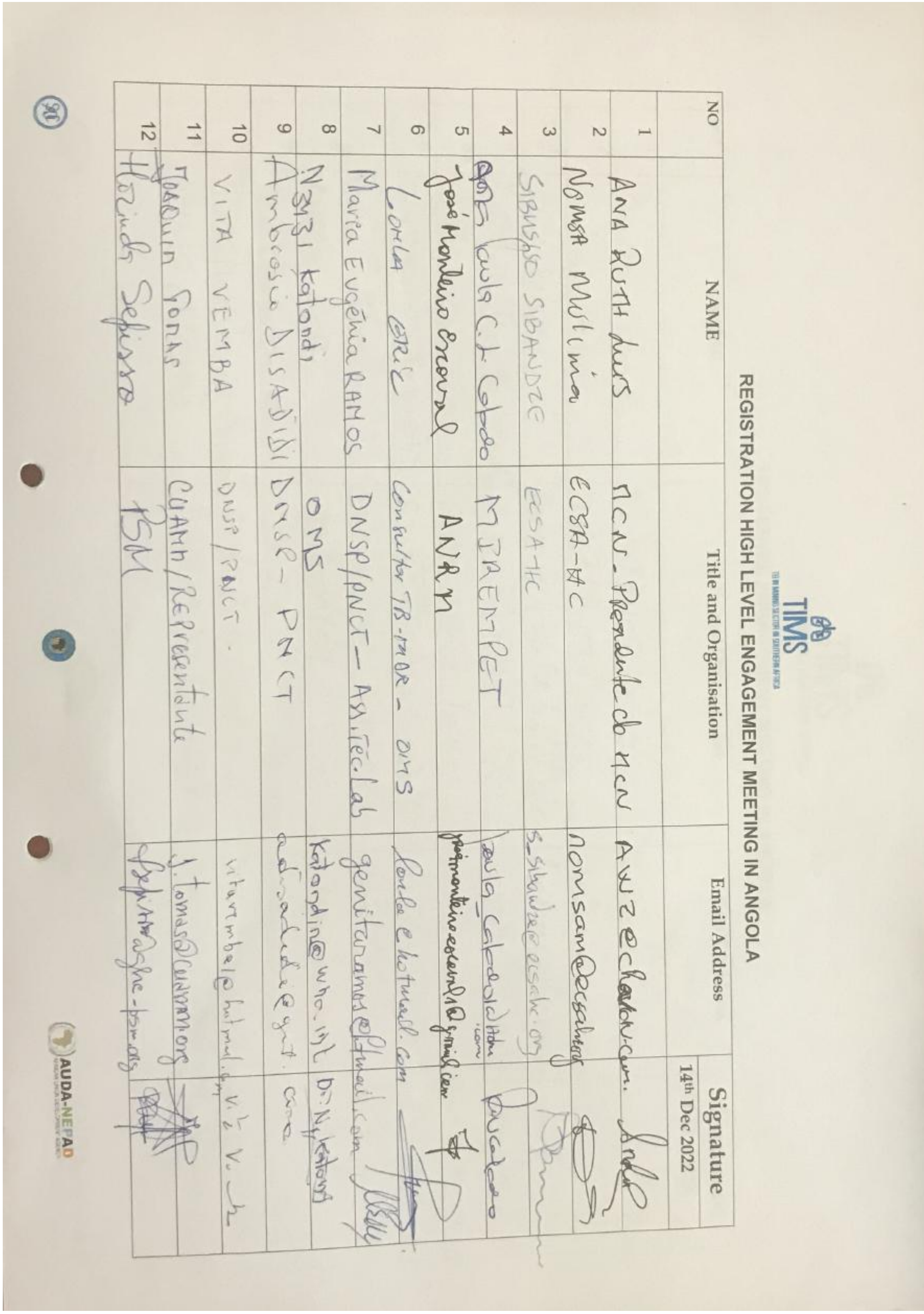
8.3 ATTENDANCE LIST FOR ECSA-HC /TIMS MISSION IN ANGOLA



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TB IN MINING SECTOR IN SOUTHERN AFRICA

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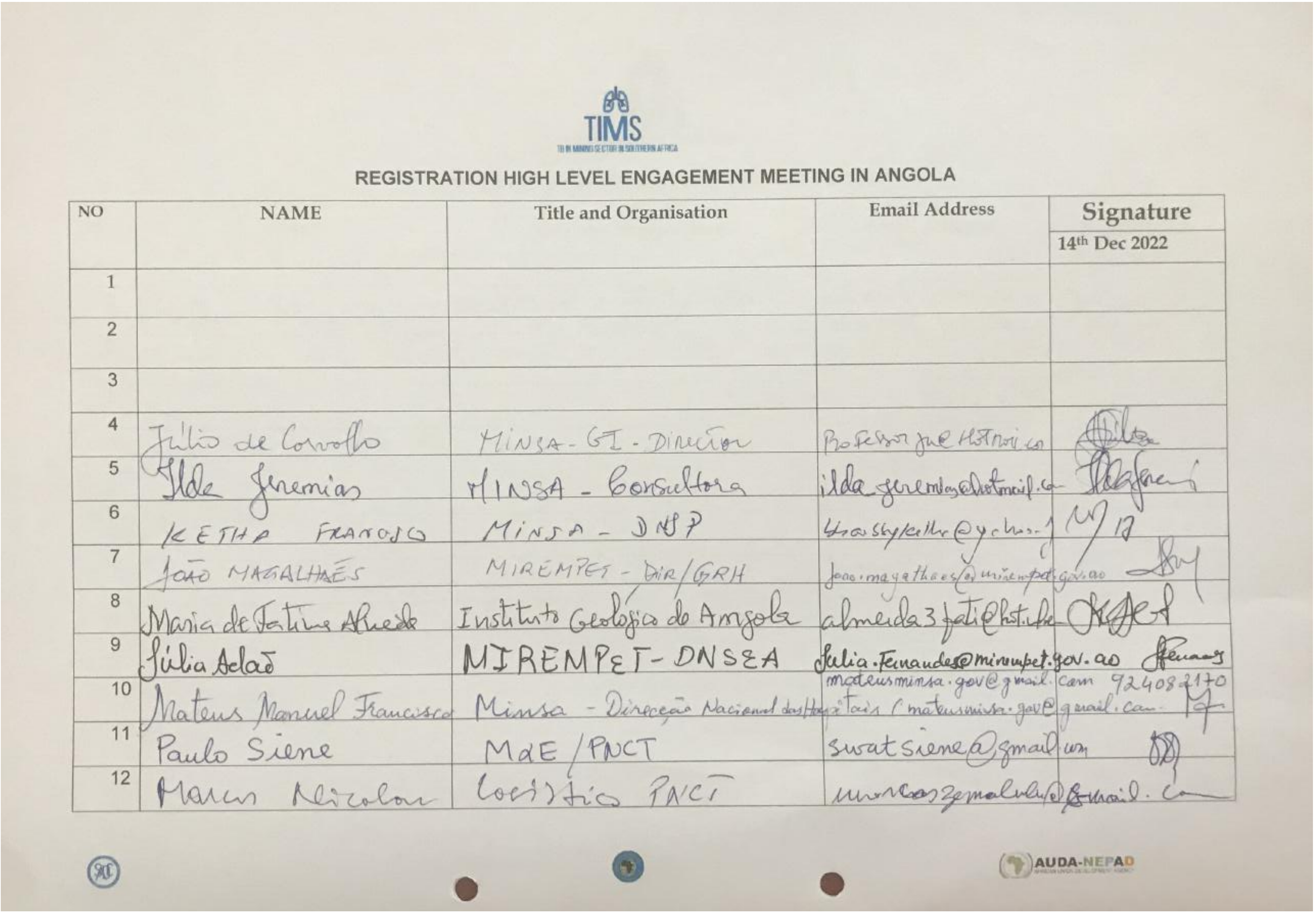

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REGISTRATION HIGH LEVEL ENGAGEMENT MEETING IN ANGOLA

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