The Business Case for Private Sector Investment for Malaria Elimination in Zambia

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This report was written by Rima Shretta as part of a consultancy to the Africa Leaders Malaria Alliance in support of the national malaria elimination strategy in Zambia.

Executive Summary

Main findings

- Private sector employees in Zambia miss an average of 4 days for each malaria episode
- Employees miss an additional 2.5 days to care for their families when they have malaria
- 16.3 million days per year are lost annually by private sector employees due to malaria
- Businesses lose between USD 606-747 million in revenue and indirect costs from productivity losses
- Business lose an additional USD 15.2 million in direct costs for diagnosis, treatment and prevention of malaria in employees
- Eliminating malaria will provide an economic return of between 15-29 times the investment
- A resurgence could result in revenue losses of USD 0.83 - 1.02 billion to Zambian businesses

Zambia has made significant progress reducing malaria over the past decade decreasing incidence by over 60% and deaths by about 87% since 2001, prompting the Government of Zambia (GRZ) to launch an ambitious elimination strategy by 2021. However, current financing falls short of the available resources and an annual gap of over USD 50 million is anticipated for the years 2019-2021. This has prompted the GRZ to forge stronger partnerships with the private commercial sector, particularly as malaria elimination efforts can have a positive economic impact on business revenue. The purpose of this paper is to provide the economic evidence and inform an advocacy strategy for resource mobilization for the private sector in Zambia.

This report draws on literature reviews, document reviews, internet-based research and interviews with select private sector partners in Zambia. Both qualitative and quantitative analyses were employed. The qualitative analysis identified incentives that could motivate companies to increase their investments while the quantitative analysis estimated the cost of malaria to businesses and estimated the potential revenue gains that they could achieve if the disease were eliminated.

The findings indicate that malaria is a significant health issue for businesses in Zambia. Employees in the private sector miss an average of 4 days when afflicted with malaria and an additional 2.5 days when taking care of a malaria episode in family members. A total of 16.3 million days per year are lost by private sector employees due to the disease. The economic burden of the disease is significant. Businesses lose about USD 606-747 million due to losses in productivity, direct and indirect costs and externalities due to the disease. Malaria places an estimated direct variable cost of USD 15.2 million for diagnosis, treatment and prevention on this sector. Eliminating malaria will provide savings at a net present value of USD 2.97 – 3.66 billion over 10 years and a return of 15-29 times the investment. However, gains are fragile and a resurgence of the disease to levels seen in 2001 could lead to an additional of 2.5 million cases and over 8000 deaths resulting in an annual loss of revenue of USD 0.83-1.02 billion to businesses in Zambia.

Eliminating malaria makes good business sense and provides robust economic returns in addition to garnering goodwill in communities. A stronger Zambian economy will increase consumer spending, boosting corporate returns even further. Although some businesses in Zambia have a history of participating in malaria control activities, newer partnerships are needed. Taxes and other incentives including access to capacity building and favorable pricing from pooled procurement and other initiatives will help to strengthen their engagement. Corporate social responsibility awards from the high levels of central government, chambers and business associations are also potential facilitators. An

overarching policy as well as a multisectoral plan with businesses included as equal partners in the malaria elimination strategy is needed. The End Malaria Council can play a critical role to facilitate these actions and advocate for a more enabling environment for private sector investments in malaria as well as act as ambassadors to make the business case for increased investments to achieve national malaria elimination.

Abbreviations

Acronym	
ACT	Artemisinin-based combination therapy
ALMA	African Leaders Malaria Alliance
BCR	Benefit-cost ratio
CHAZ	Churches Health Association of Zambia
CHW	Community health worker
COMESA	Common Market for Eastern and Southern Africa
CSR	Corporate social responsibility
E8	Malaria Elimination 8
EMC	End Malaria Council
FQM	First Quantum Minerals
GDP	Gross Domestic Product
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GNI	Gross National Income
GRZ	Government of the Republic of Zambia
GVA	Gross Value Added
IEC/SBCC	Information, education, and communication
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
IVM	Integrated vector management
KCM	Konkola Copper Mines
LLIN	Long-lasting insecticide-treated mosquito net
MACEPA	Malaria Control and Elimination Partnership in Africa
MCM	Mopani Copper Mines
MOH	Ministry of Health
MSME	Micro small and medium enterprises
NMEC	National Malaria Elimination Centre
NMESP	National Malaria Elimination Strategic Plan
NGO	Nongovernmental organization
NPV	Net Present Value
PACRA	Patents and Companies Registration Agency
PMI	President's Malaria Initiative
RBM	Roll Back Malaria Partnership to End Malaria
RDT	Rapid Diagnostic Test
ROI	Return on Investment
SADC	South African Development Community
SBCC	Social behavioral change communication
USD	United States Dollar
WHO	World Health Organization
ZEITI	Zambia Extractive Industries Transparency Initiative
ZMK	Zambian Kwacha

Contents

Introduction

Zambia has made significant progress reducing malaria over the past decade reducing incidence by over 60% and deaths by about 87% since 2001 (NMEC, unpublished data) (Figure 1).

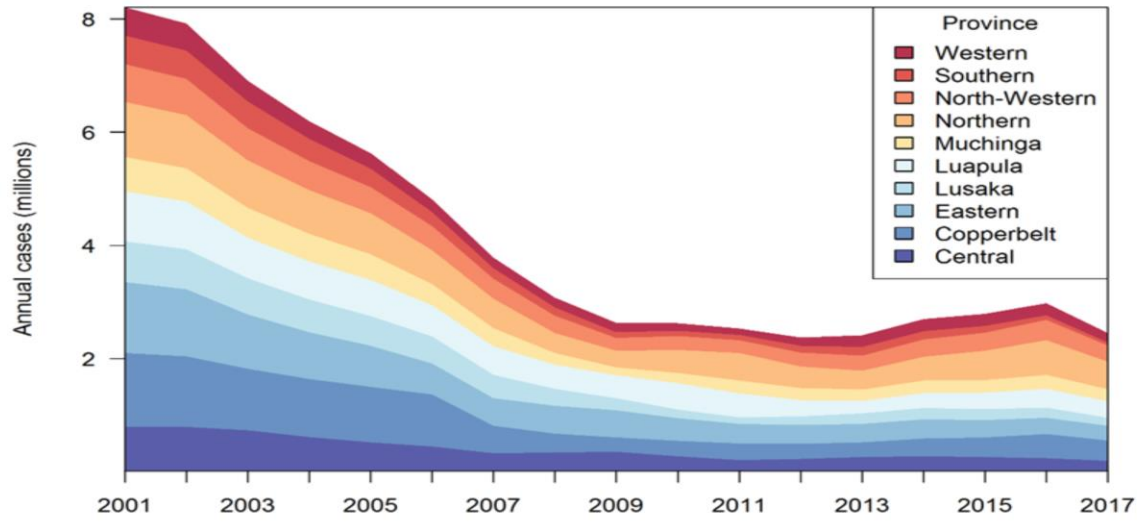

Figure 1. Annual malaria cases (2001-2017) in Zambia by province (GRZ/MOH, 2018[1])

This success prompted the Government of Zambia (GRZ) to develop and launch the National Malaria Elimination Strategic Plan (NMESP) 2017–2021 (GRZ/MOH, 2017), an ambitious strategy to move from accelerated burden reduction to malaria elimination in Zambia by 2021. The total cost of Zambia's elimination strategy (2017-2021) was estimated at just over USD 694 million (GRZ/MOH, 2017b). Newer analyses from the National Malaria Elimination Center (NMEC) estimate the need for 2019-2021 to be about 250 million of which only about 37% is currently financed (commitments) from GRZ, President's Malaria Initiative (PMI)/United States Agency for International Development (USAID), the Global Fund for HIV, TB and Malaria (Global Fund) and others[2], leaving a gap of about USD 155 million for the implementation of the national strategic plan for 2019 - 2021 (table 1).

Table 1. Financing available for malaria in Zambia and anticipated gap (USD)

	2019	2020	2021	Total
Need	57,939,059	103,320,187	85,055,330	246,314,556
Financed	15,127,397	30,653,137	45,889,949	91,670,482
Gap	42,811,663	72,667,050	39,165,382	154,644,092

Source: GRZ/MOH (unpublished)[3]

Zambia is currently classified by the World Bank as a Lower Middle-Income Country (LMIC). Although the country is not expected to reach upper-middle income status over the next 10 years (author's calculations from IMF projections of economy), as the country's economy grows, the amount of donor

[1] Generated by MRC Centre for Outbreak Analysis and Modelling, Imperial College, London

[2] Sources of financing in 2018 included PMI/USAID (USD 28 million), the Global Fund (~ USD 23 million) and the private sector (~ USD 2.5 million).

[3] Obtained from NMEC

funding is likely to be scaled down, further widening the resource gap. Although the GRZ has significantly increased its contribution for malaria activities from less than USD 1 million in 2010 to USD 30 million in 2018, additional domestic financing will be needed to close the funding gap. While several private sector firms in Zambia have a history of collaboration with the NMEC, the gap in funding and the understanding that malaria elimination will require a multisectoral approach has prompted greater resolve for commercial sector involvement, particularly as malaria elimination efforts can have a positive economic impact for businesses.

To this end, H.E. President Lungu launched the End Malaria Council (EMC) on March 7, 2019, bringing together influential leadership to assist in advocacy and resource mobilization efforts. The launch was attended by the Minister of Health, Bank of Zambia, Zambia Revenue Authority, Chief Mumena (one of the country's most respected traditional leaders), the Anglican Church, development partners and several representatives from the private commercial sector: First Quantum Minerals Limited, Kansai Plascon, Toyota Motors, Zambia Sugar and Trade Kings. The EMC is chaired by the Minister of Health, Hon. Chitalu Chilufya.

Purpose of paper

The purpose of this work was to understand the key drivers for private sector investments in malaria in Zambia and to develop a quantitative and qualitative business case for private sector investment in malaria elimination. A previous study conducted by RBM in 2011, demonstrated the positive economic returns from the investment of three businesses in Zambia (RBM 2011; RBM 2011b). This paper aims to build on this work.

Specific objectives include:

- Quantify the economic burden of malaria on business in Zambia
- Quantify the economic benefits to private sector businesses by investing in malaria elimination
- Articulate the main motivators for increased private sector investment in malaria elimination
- Provide recommendations for an advocacy strategy for private sector investment

Methodology

This paper draws on literature reviews, document review and internet-based research and interviews with select private sector partners in Zambia. Both qualitative and quantitative analyses were employed to develop the business case.

Data collection

Relevant stakeholders and interviewees were identified for interviews in collaboration with the NMEC and the EMC. Interviewees were identified purposively based on location, existing malaria partnership with the NMEC and availability. Interviews were conducted in person and by phone in April and May 2019. Follow up for information was done by email and telephone as needed. A total of 15 interviews were conducted, (4 copper mining companies, 4 manufacturers, a gem miner, an advertising company, an oil and gas company, a wholesaler, a contractor, a hotel chain and a major bank) as well as 4 key informants from various associations. Interviews were conducted using a semi-structured interview guide specifically developed for each of the sectors. Interviews were conducted with relevant heads of departments including human resources, health and safety departments or corporate affairs or corporate social responsibility departments.

Quantitative data collection

Data was collected from the NMEC and specific companies to determine: i) the direct cost to the companies for malaria diagnosis and treatment ii) the revenues lost by companies due to absenteeism and decreased consumer spending. Data was only available from select companies; therefore, inferences were made based on national and regional level estimates of the labor force from literature reviews, the cost of treatment and prevention, the average length of illness and absenteeism due to malaria

Qualitative data collection

Interviews identified the main activities being conducted by the businesses in support of malaria control and elimination and general health. The interviews also elucidated the main motivators for investing in malaria activities in Zambia and determined the main barriers and potential facilitators for new and continued investment by businesses.

Data analysis

Quantitative data analysis

The quantitative analysis focused on estimating the impact of malaria on business revenues which included productivity losses due to absenteeism as well loss of revenue due to diversion of consumer spending owing to expenditures on malaria illness in addition to the costs of malaria prevention and treatment. Due to the heterogeneity of malaria in Zambia as well as the differences in employment and income per capita across the country, the analysis was done at a provincial level.

Revenue losses

The Central Statistics Office estimated that about 3.4 million Zambians or 20% of the total population made up the labor force in 2017 (CSO, 2018). Of these 60% were males and 40% were females. This was extrapolated to 2019 figures using projected population growth rates to obtain a total workforce of 3.62

million. Of the total labor force, 5% were employed in the public sector, 7% in the formal private sector and 88% in the informal private sector. The total number of employees in the private sector were therefore estimated to be 3.4 million in 2019.

Data on the average monthly household income (LCMIS, 2015), the number of households and the number of private sector employees by province (CSO, 2018) were used to obtain the income per capita of employees working in the private sector in each province. All data were extrapolated to 2019 using population growth and inflation rates.

The total number of cases in the private sector labor force was computed using the available estimates of provincial malaria incidence from the NMEC. This was further disaggregated into cases in the adult population (> 15 years) using a national level incidence of 275 per 1000 population obtained from the NMEC (GRZ/MOH, 2017) and those employed in the private sector. Given that the vast majority of employees work for the private sector including contractors, we assumed that the remaining cases in the country (total cases in country – total cases in the adult labor force in the private sector) would still have some association with the private sector and hence impact business productivity.

Interviews with key informants from select businesses as well the NMEC revealed that employees missed an average of 4 days for each malaria episode that they suffered from. These were multiplied by the number of cases in private sector employees to obtain the total number of days missed due to malaria illness in employees. In addition, employees were absent from work when family members were sick. The number of days of absenteeism due to caregiving was estimated at 2.5 days per malaria episode. This was obtained by computing a weighted average of 4 days for female workers (primary caregivers) and 1.5 days for male workers (obtained from interviews). This was multiplied by the total number of non-adult cases to obtain the total number of days lost due to caregiving.

Productivity was calculated as the cost of labor by province plus the Gross Value Added (GVA) by each employee. The national GVA was estimated to be USD 18.4 billion (ZMW 230 billion), obtained from the National Accounts (UNdata, 2017). This was divided by the total number of provinces to obtain the GVA of each province and further divided by the number of employees in each province in the private sector to obtain the GVA per private sector employee by province. The total number of days lost due to malaria illness in employees (4) and caregiving in families (2.5) was further multiplied by the daily productivity of each employee working in the private sector per province to obtain the total revenue lost due to malaria in all private sector employees. Additional analysis of the revenue losses incurred if the absent employees were replaced with part-time workers. Data from the two of the businesses interviewed estimated that an average of 47% of absentee employees who had daily essential tasks would to be replaced with contract staff who would also have to be paid in addition to the regular full-time staff. The costs of this additional staff hire were added to the revenue lost. Both implications of these assumptions have been illustrated.

All respondents from the private sector also mentioned “presenteeism” to be a factor on productivity lost. Most employees that were sick with malaria were less productive after they returned to work for an additional 6 days. We assumed that the output due to this “hangover effect” was 50% of the output/productivity of a healthy worker. Given that this is an estimate not backed by empirical data, we created a sensitivity analysis (at 25 and 75%) to assess the elasticity of this input on the total revenue lost. The revenue lost due to absenteeism was added to the revenue lost due to “presenteeism” to obtain the total revenue lost by businesses due to malaria.

Businesses will also indirectly benefit from savings made in the public sector when malaria is eliminated. Discussions with the NMEP and experts in the country as well as experience from other countries that have recently eliminated malaria suggest that the cost savings from elimination and the implementation of interventions to prevent re-introduction (for example, targeted IRS, surveillance and response and diagnosis and treatment of imported cases) would be about 60% of the cost of full-scale treatment and prevention malaria control interventions. This assumption is reasonable given that Sri Lanka experienced a reduction of over 90% in public sector expenditure when comparing control to elimination (Abeyasinghe, 2012; Shretta, 2016). To estimate the magnitude of public sector savings on corporate revenue return we used projected data on the malaria budget from domestic sources for 2019-2020 (GRZ/MOH, 2017), and calculated the cost savings from elimination. We assumed that a proportion of the savings from the domestic budget would be redirected to the private sector. This proportion was assumed to be the percentage of the domestic budget that was from corporate taxes and Pay as You Earn (PAYE) contributions (estimated at 31% by KMPG, 2017). The rationale for this assumption is that these will most effect the private sector because they divert consumer spending or are a direct cost to the private sector.

The private sector will also indirectly benefit from reduced out of pocket (OOP) expenditures by households if malaria was eliminated. This is due to the diverted consumer spending on malaria related costs such as transport to health facilities as well as opportunity costs, a portion of which would otherwise be spent on consumables which will ultimately benefit the total private sector market. Households spend about ZMK 26.9 (USD 2.2) per month or USD 25.8 annually on OOP expenditures for malaria (Musole, Year unknown). Once malaria is eliminated, this diverted consumer spending will increase private sector revenues. We multiplied this by the number of households/families to obtain the total OOP expenditure that would be saved by malaria elimination

Table 2 illustrates the data used as inputs in the quantitative analysis.

Table 2. Input data used in the quantitative data analysis

Input data	Value	Source
Population	17,356,732	CSO, 2018
Population growth	3.2%	CSO, 2018
Population >15 years	8,678,366	CSO, 2018
Labor force	3,619,265	CSO, 2018
% of labor force that are females	40%	CSO, 2018
% of labor force that are males	60%	CSO, 2018
% of labor force in government	5%	CSO, 2018
% of labor force in formal private sector	7%	CSO, 2018
% of labor force in informal private sector	88%	CSO, 2018
GDP	25.8 billion	World Bank
Income multiplier (see explanation in text)	1.4	ICCM, 2014
Malaria cases (2018) suspected	10,13 million	NMEC unpublished data
Malaria cases (2018) confirmed	5.95 million	NMEC unpublished data
Malaria deaths (2018)	1211	NMEC
Incidence in adults	275/1000	NMEC
Incidence in children	756/1000	NMEC
Number of days absent per malaria episode	4	Interviews
Number of days absent due to caregiving	2.5	Interviews

Input data	Value	Source
Number of days of reduced productivity after return to work (per malaria episode) (presenteeism)	6	Interviews
Cost of treatment per case	USD 2.5	GRZ/MOH, 2018
Cost of IRS per person protected	USD 4.8	GRZ/MOH, 2018
Cost of diagnosis per suspected case	USD 1.1	NMEC
Average annual cost of malaria elimination	111,600,000	NMEC
Cost savings from elimination	60%	Estimated from interventions needed to continue post-elimination
Malaria budget from domestic sources in 2019 (annual)	30%	NMEC
% of domestic budget from PAYE and corporate taxes	31%	KPMG, 2017
OOP expenditures on malaria	ZMK 26.9/family/month (USD 2.2)	
Number households	3,382,132	CSO, 2018 (extrapolated)
Exchange rate (2019)	1 USD = 12.5 ZWK	Oanda.com
Discount rate	3%	Standard
Inflation (discount) rate for NPV calculation	10%	Standard
Resurgence scenario (2001)		
Cases	8 million	NMEC
Deaths	9369	NMEC

To calculate the economic impact of deaths on private sector revenue we estimated that 39% of deaths would occur in adults (WHO, 2018) and of these 95% (the % employed in the private sector) affected the private sector. We used the full income approach to estimate the economic impact of deaths (Jameson, 2013) using the formula:

$$Deaths\ averted\ x\ Life\ expectancy\ at\ age\ 40\ x\ 4.2\ x\ GDP\ per\ capita\ (current\ USD)$$

Direct (variable) cost to businesses

Based on interview data on the number of businesses implementing in IRS, we assumed that only half of the large businesses (employing 7% of those working in the formal private sector) would be undertaking IRS for their employees. We also assumed that to achieve elimination, employers would pay for the testing of all suspected cases the treatment of all confirmed cases. These were totaled to obtain the direct costs to businesses. This was estimated for employees as well as families.

Multiplier effect

In addition, employees are likely to spend additional wages and salaries on consumables which creates demand in the local economy and spurs the creation of new businesses injecting more money into the local economy; the employees of supplier firms in turn spend their wages, creating yet more demand. Throughout the process, overall disposable incomes increase, creating more markets for local businesses. These induced responses result in an economic multiplier effect.

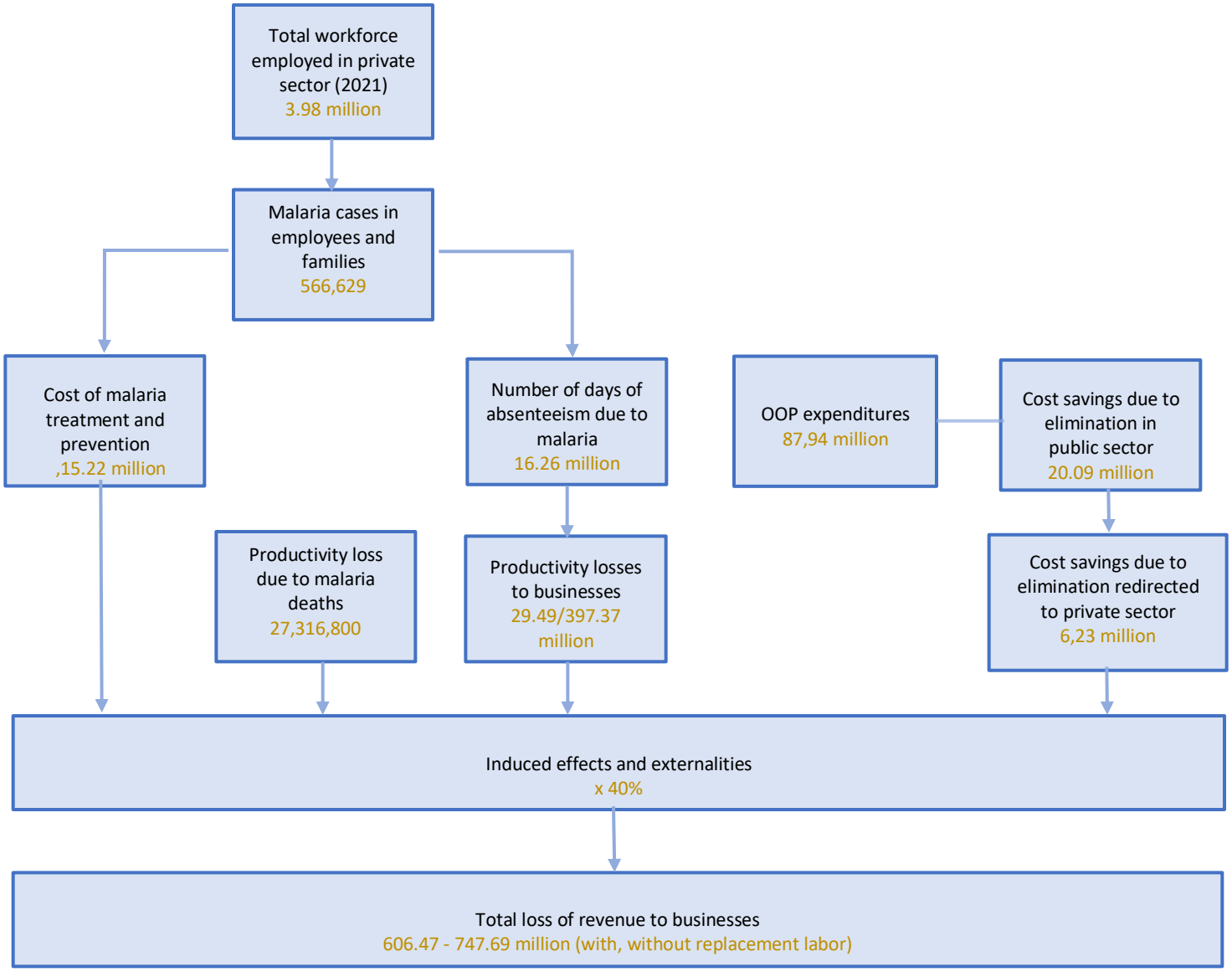

Figure 2. Data and analysis to determine the burden of malaria and loss of revenues to businesses in Zambia

The magnitude of this was obtained from published estimates on the household's propensity to spend and multipliers associated with expenditures (ICCM, 2014). Given that the multiplier for consumer spending on transport (2.26) - the proxy for OOP expenditures on malaria - was less than the average of the multipliers for other consumer expenditures multipliers (agriculture, livestock, textiles, education), we used the difference between the two (2.66-2.26) to obtain the incremental effect of induced demand. A multiplier of 40% was therefore added to account for the induced demand.

The overall revenue generated in the private sector by eliminating malaria was calculated by adding the direct, indirect and the induced costs.

$$Total\ revenues\ generated\ from\ malaria\ elimination\ (Benefits\ of\ malaria\ elimination) =$$

$$[Revenue\ generated\ from\ reduced\ absenteeism, presenteeism$$

$$+ Revenue\ generated\ from\ reduced\ deaths$$

$$+ Indirect\ revenue\ generated\ from\ diversions\ of\ consumer\ and\ public\ sector\ spending$$

$$+ (Direct\ cost + indirect\ cost\ on\ malaria\ treatment\ and\ prevention)]$$

$$\times multiplier\ (1.4)$$

Figure 2 illustrates the steps in the data analysis.

Net Present Value

The Net Present Value (NPV) was calculated to obtain the present value of the future revenue generated from elimination using standard economic techniques. The purpose was to give businesses a true picture of the financial value of their investment. The timeframe used for calculating the NPV and ROI was 10 years and a 10% discount rate (commonly used in these analysis) was applied.

Multiplier effect

The return on investment (ROI) over the time period 2019-2029 was computed: both the run rate and the NPV and both figures are presented.

$$ROI = \frac{Net\ revenue}{Total\ cost}$$

OR

$$ROI = \frac{NPV}{Total\ cost}$$

Economic impact of potential resurgence

To obtain the potential excess cost of a resurgence, we used historical malaria case data. We assumed that reported malaria cases would rebound to the levels seen in 2001 (incidence 475/1000 in adults) to calculate the excess morbidity and direct and indirect revenue losses to businesses.

Costs that were measured in ZMK were converted to 2019 USD using an exchange rate of USD1 to ZMK 12.5 (Oanda, 2019). Unless otherwise specified, costs and benefits were discounted at a rate of 3%.

Case study

Data from 2010-2017 on reported cases for Zambia Sugar was obtained from company records. Data for Mopani Copper Mines (MCM) and Konkola Copper Mines (KCM) were extrapolated using the previous data from the 2011 Roll Back Malaria (RBM) Progress and Impact Serie. This report on three large companies in Zambia illustrated that malaria control activities conducted in the period 2000-2009 resulted in a decline in malaria cases and malaria-related absenteeism by 94% and malaria-related spending in company clinics by 76%. In the same period, a total of 108,000 malaria episodes were averted and 300 lives were saved producing an estimated internal rate of return of 28% (RBM, 2011).

Qualitative data analysis

The main motivators, enablers and incentives for private sector investment in malaria elimination efforts were compiled and listed and the proportion of respondents that mentioned the factor was recorded. Challenges and barriers to investment were similarly compiled.

Limitations

The study was limited by time and access to data from companies on costs and cases treated in the health facilities. Although data is collected, it is not collated and readily available at the central level. While respondents provided anecdotal information on absenteeism due to malaria and resulting losses in productivity, these are not routinely collected. Some companies were able to provide total absenteeism and general information on the number of days missed due to malaria from which we deduced the absenteeism for the entire private sector. These assumptions are consistent with data from other countries that have been published and used in standard economic analyses for malaria.

While absenteeism from school has an impact on overall educational attainment, we did not include it, as the quantifiable impact on future earnings is largely unknown, and the time frame often results in these impacts becoming negligible due to discounting.

The findings are also limited by a lack of output from a transmission model to predict elimination an empirical annual estimate of cases and costs averted due to malaria interventions. We assumed that the interventions as outlined in the NMESP will achieve elimination at the given cost in the business plan.

Nevertheless, we believe that the estimated benefits of elimination on businesses are conservative. Beyond the benefits of achieving malaria elimination as explained in this report, other by-products of national elimination are likely, such as increased tourism, a strengthened health system, better cognitive development, and improved regional health security. These have not been included as there are no reliable quantifiable methods to estimate their impact on the economy.

Macroeconomic context and business environment in Zambia

Zambia's population in 2018 was estimated at approximately 17.36 million people (CSO, 2018). The country is divided into 10 provinces and 109 districts. Approximately 60 percent of the population resides in rural areas, while 40 percent lives in urban areas. The Lusaka and Copperbelt provinces are predominantly urban, while the other provinces are largely rural.

Zambia's efforts to reduce the malaria burden and address other health challenges are part of a broader agenda aimed at attaining significant and sustainable socioeconomic development. The Vision 2030 Strategy is being implemented through successive five-year national development plans, including the National Development Plan 2017–2021. Vision 2030 identified malaria control as a key priority area for achieving the stated development goals.

During the period 2004-2014, Zambia achieved impressive economic growth, averaging 7.4% per year. The strong economic growth raised the average per capita income from USD 450 in 2004 to over USD 1,770 in 2014, making Zambia a lower-middle income nation. However, growth only benefitted a small segment of the urban population and had limited impact on poverty. Zambia ranks among the countries with highest level of inequality globally. 58% of Zambia's population earns less than the international poverty line of $1.90 per day (World Bank, 2019).

Table 3. Select social and economic indicators

Population (201	17.36 million
GDP	25.8 billion
GDP growth	3.3%
GDP composition by sector (2017 est.)	Agriculture: 54.8% Industry: 9.9% Services: 35.3%
GNI per capita (atlas method) (2017)	USD 1490
Labor force by occupation	Agriculture: 7.5% Industry: 35.3% Services: 57%
Industries	copper mining and processing, emerald mining, construction, foodstuffs, beverages, chemicals, textiles, fertilizer, horticulture
Agriculture	corn, sorghum, rice, peanuts, sunflower seeds, vegetables, flowers, tobacco, cotton, sugarcane, cassava (manioc, tapioca), coffee; cattle, goats, pigs, poultry, milk, eggs, hides
Tax revenue as a % of GDP	15.2%
Unemployment rate (2017)	7.79%

Sources: World Bank (2019), Central Statistics Office (CSO), Atlas of Economic Complexity

The main contributors to overall growth of Zambian industry include the manufacturing industry, agriculture industry, transport and communication, construction and wholesale and trade. These industries collectively accounted for more than 70% of Gross Domestic Product (GDP). The GDP composition by sector includes agriculture that accounts for 54.8.8% of the GDP, industry at 9.9% and services at 35.3% (World Bank, 2019).

Mining continues to be a driver of economic development in Zambia generating between 9 and 15% of the gross domestic product (GDP). Mineral exports have contributed between 60 and 90% of total national foreign exchange earnings for over 70 years. The mining industry currently employs over 35,000 people. In addition, they contract with numerous companies e.g., transportation, construction, other services, therefore directly affecting employment and revenues in a larger segment of the population than their employees. For example, the four larger copper mining companies (Konkola Copper Mines PLC, Lubambe, Mopani and Barrick Lumwana) work with an additional 2,517 contractors (Nyambe, 2015). Foreign Direct Investment (FDI) in the mining sector has increased and China, Canada, and India are the most prominent investors (governments and parastatals). Chinese investment in Zambia has also increased in the agriculture, manufacturing and mining sectors (Lusaka times, 2016).

Zambia's mining activities are scattered across the country; however, large-scale mining is mainly located in Copperbelt and North-Western provinces both of which continue to experience a high incidence of malaria (> 500 cases/1000). Zambia is Africa's second-largest copper producer. The Copperbelt has been the center of copper and cobalt mining in Zambia, while lead-zinc has been mined in Kabwe, Central Province and pyrite in Nampundwe, Lusaka Province. All these mines were previously run by Zambia Consolidated Copper Mines (ZCCM) Ltd, a government parastatal. Its successor, ZCCM Investments Holdings (government has a 77.7% of shares) continues to have a stake is several companies. Furthermore, Lusaka has been a host of limestone quarrying for decades as an industrial activity under the then Chilanga Cement, now called Lafarge. The other notable area where this industrial mining has been active is the Copperbelt Province, where Ndola lime, Zambezi Portland and Dangote mine limestones are located. North-Western Province has recently imaged as the "New Copperbelt" due to large mining investments that have taken place over the last decade. This includes Lumwana (Kansanshi Mine) and Kalumbila. Base metal mining has also been developed in the last decade for example, the Albidon Nickel Mine in the Southern Province. Other mining activities are small-scale mining of gemstones; including emeralds, amethysts, aquamarines, tourmalines, garnets and citrines mined in Eastern, Central and Southern Provinces.

Tourism also plays a part in the economy contributing over 3% to the country's GDP. In 2012, Zambia received 859,088 tourists concentrated in a limited number of national parks, such as the South Luangwa, Kafue (both in Lusaka Province), Lower Zambezi (Southeastern), Musi-o-Tunya (Southern) and Kasanka (Central Province). Most of these areas carry a relatively lower risk of malaria compared to the rest of the country. The tourism sector structure of Zambia comprises of several types of enterprise including lodges, hotels, tour operators, guesthouses and transport providers. There are several large international franchises and chains in Zambia including Southern Sun, Protea Hotels, Intercontinental and Taj Group.

Other industries of Zambia include beverages, food, textiles, chemicals, fertilizer and horticulture. The country also exports tobacco, sugar and cotton. In recent years, the construction industry has been pivotal in Zambia's growth, contributing over 20% to the economy. Its main trading partners are China Switzerland followed by the Democratic Republic of Congo (DRC) and South Africa. In February 2007, Zambia and China announced the creation of a Chinese-Zambian economic partnership zone around the Chambishi copper mine (World Bank, 2019). Zambia is a member of the Common Market for Eastern and Southern Africa (COMESA) and the Southern Africa Development Community (SADC).

The World Bank ranks Zambia as 65 on the global ease of doing business scale (World Bank, 2019). For growth to be sustainable in manufacturing and other industries there is a need for improved access to finance and continued implementation of reforms to increase participation of the private sector. High

interest rates in Zambia remain a challenge to accessing credit particularly for small businesses. To reduce lending rates, the Zambian government reduced the corporate tax rate from 40% to 35% in the banking sector (World Bank, 2019). However, in 2019, the budget speech announced that the current 16% Value Added Tax (VAT) would be abolished and replaced with a system of sales tax. This is expected to be effective at a later date in 2019 and has raised concern amongst the business community in Zambia (Personal Communication, ZAACI).

In 2004, Zambia launched the Private Sector Development Reform Program (PSDRP) in an effort to encourage private sector investment in the country. Currently, 80 percent of private-sector business in Zambia is conducted by Micro, Small and Medium enterprises (MSMEs) with fewer than 50 employees. These rural businesses also employ the vast majority of the labor force. Of the Zambians who are employed, most (87%) work for informal enterprises with less than five employees. However, large enterprises continue to drive the economy (Conway & Shah, 2010). Figure 3 illustrates the distribution of MSMEs and large businesses by sector (Shah, 2012).

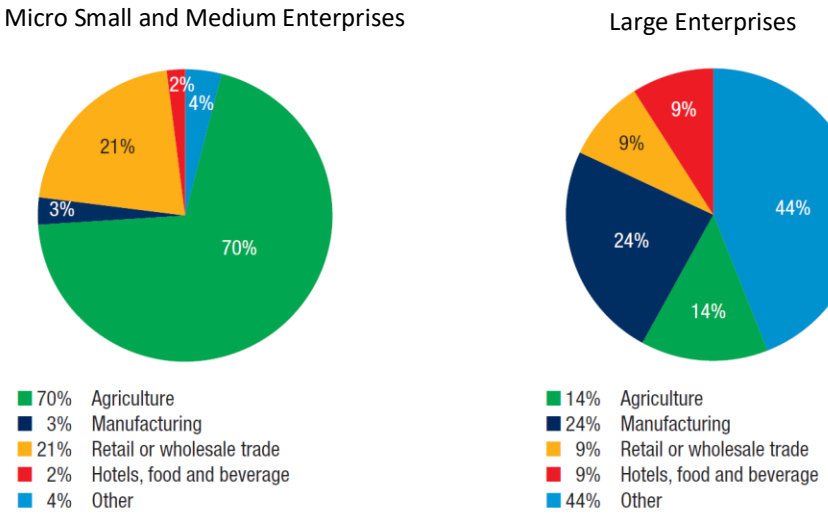

Figure 3. Distribution of private sector enterprises by sector (ZBS 2010)

In 2011, there were 1.02 million informal micro and small enterprises (MSMEs) in Zambia, along with about 30,000 formal MSMEs. A vast majority of these "businesses" are very small: only 15% of firms have revenues greater than 1m kwacha per month (USD 200)[4] and less than 8% have revenues more than 2 million kwacha (USD 400). Only 10% of MSMEs have more than 10 workers and many of these have unpaid or paid-in-kind workers along with regular employees. Only 3% of MSMEs are registered businesses while 99% of large firms with more than 50 employees are registered for tax purposes (Shah, 2012). Figure 4 illustrates the distribution of MSMEs by province. Businesses are located throughout the country although over 20% are concentrated in the Eastern Province. Many of the large businesses (not shown) are located in the Copperbelt, Northwestern and Lusaka provinces.

[4] Zambia's currency was rebased and renamed in 2013. USD calculated in 2010 mid-year exchange rates (1 USD = ZMK 4998,30)

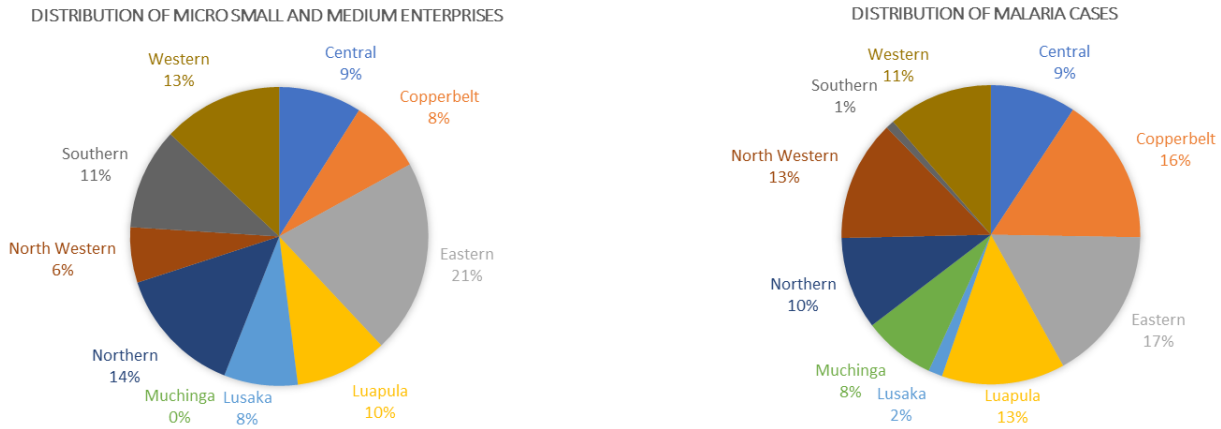

Figure 4. Distribution of Micro Small and Medium Enterprises (Shah 2012) and malaria cases (NMEC, 2018) by province

The figure on the right illustrates the malaria cases in Zambia in 2018. A large proportion of businesses are located in areas of high malaria incidence including Copperbelt, Eastern, Luapula, Northern and Western provinces.

Figure 5 illustrates the location of businesses and malaria incidence on maps. The first shows the location of 4800 MSMEs sampled as part of the Zambia Business Survey in 2010 and the second illustrates malaria incidence. Although several businesses are located in Southern, Central and Lusaka provinces which have a lower parasite prevalence relative to the rest of the country, most of the MSMEs are dispersed throughout the country.

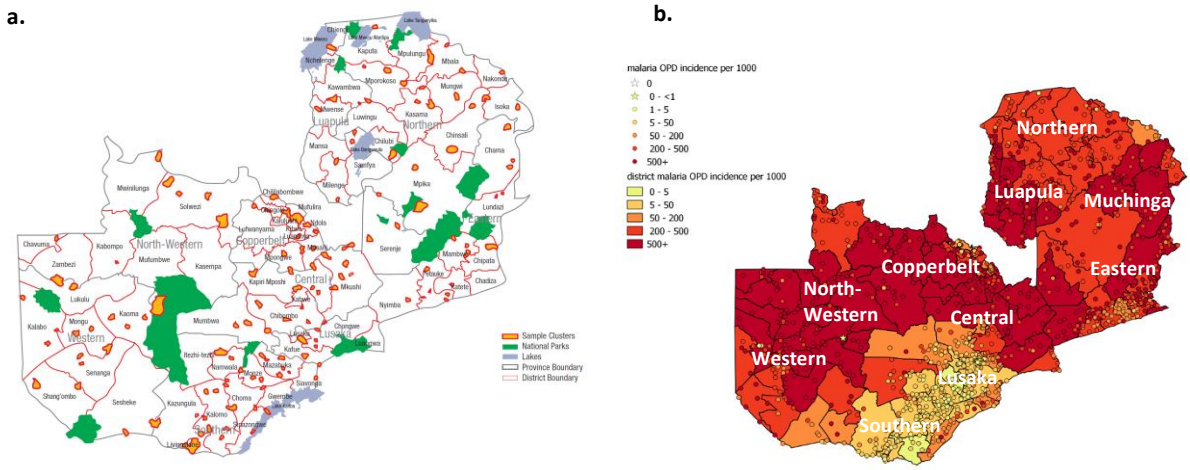

Figure 5. a) Geographical distribution of Micro Small and Medium Enterprises businesses (ZBS, 2010) and b) malaria incidence (2017)

Role of private sector in Corporate Social Responsibility in Zambia

Corporate Social Responsibility (CSR) in Zambia started at the same time as the mining industry in Zambia, spanning almost a century. While many businesses are actively involved in CSR activities including for health, there is a limited understanding of the magnitude of corporate philanthropic

investments as there is currently no department in the government that tracks these efforts. At present, no legislation exists in Zambia to govern CSR or other social protection programs (Pensulo, 2017) and the GRZ does not offer any tax or other incentives for their efforts. However, the Ministry of Foreign Affairs has recently developed a diaspora policy to engage Zambians living abroad to contribute to national development recognizing them as a key stakeholder in accelerating efforts towards vision 2030 (Lusaka Times, 2018).

A report commissioned in 2015 by ZACCI mapped Corporate Social Responsibility (CSR) activities in the mining and supply chain in Zambia identified a total of 30 companies engaged in mining activities that have been involved in reporting their CSR activities to the Zambia Extractive Industries Transparency Initiative (ZEITI) (Nyambe, 2015). For these 30 companies (Annex 3), CSR investments were a cumulative 2.9% (USD 31.4 million) in 2012 and 2.2% (USD 26 million)[5] in 2013 out of the total 100% revenue contribution by these companies to Government. The CSR activities related to infrastructure development, health, education, local business development, alternative livelihoods, water and sanitation, sports and recreation and environment. A significant volume of these CSR resources were "in-kind" contributions; for example, Kansanshi Mining reported a zero cash and a USD 3.49 million in-kind contribution in 2013. Similarly, Kalumbila Minerals reported a USD 0.68 million cash contribution and a USD 12.26 million in-kind contribution in 2013. The breakdown of these in-kind contributions was not available, illustrating the difficulty of quantifying the true contribution by the companies towards social programs. Figure 6 shows the categories in which CSR resources for the years 2012-2013 were allocated and used. The total contribution to health was less than USD 100,000 and were relatively small compared to infrastructure, education and other (Nyambe, 2015).

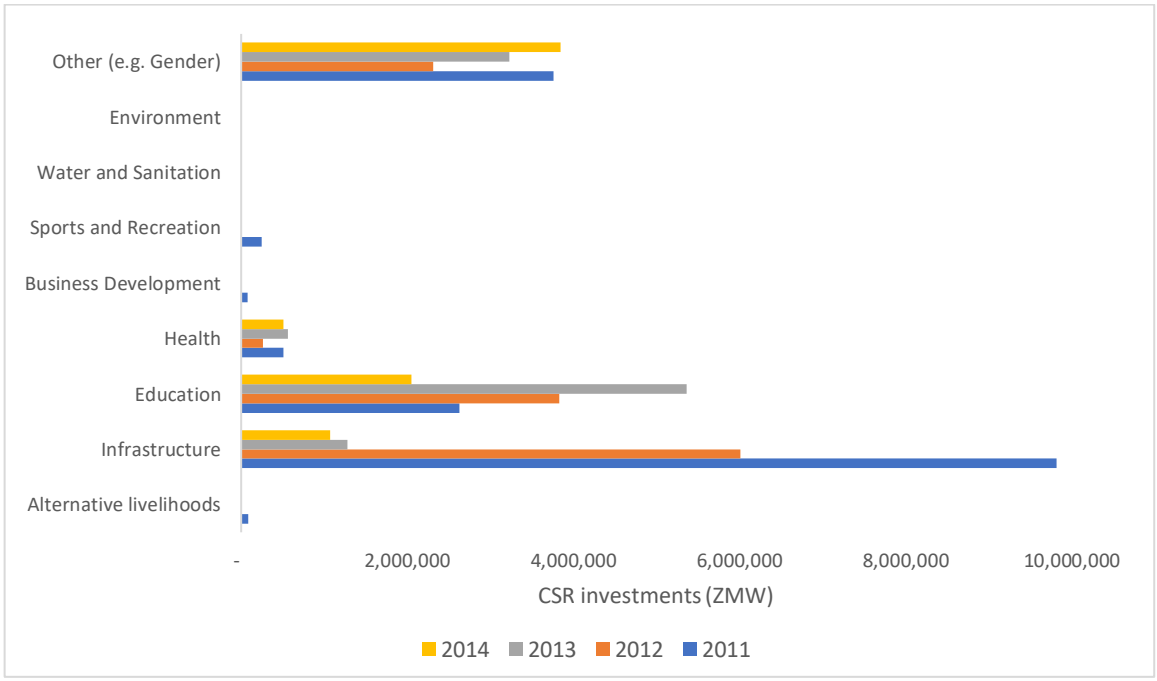

Figure 6. CSR investments (ZMW)[4] by the mining companies for the years 2011-2013 (ZEITI, 2011, 2012, 2013 in Nyambe, 2015)

[5] 1 USD = 7.28 ZMW on March 15, 2015

Background on malaria in Zambia

Zambia has made significant progress in reducing malaria over the past decade. Incidence has declined by over 60% since 2001 (GRZ/MOH, 2017). In 2018, 20 facilities in the Southern province recorded zero malaria cases for the first time. Malaria endemicity is heterogenous with the highest prevalence being in the Copperbelt and Northwestern provinces and the lowest in Lusaka and the Southern province (figure 5).

Despite the gains made in the past decade and a half, the entire country is still at risk of the disease, including vulnerable groups, such as pregnant women and children under the age of five years. In 2018, there were about 5.4 million reported cases and 1211 deaths (NMEC, 2019). Malaria accounted for almost 40% of all of outpatient attendances (WHO, 2018).

These gains could be reversed if intervention coverage interrupted. This was demonstrated in Zambia when a relative reversal in these gains when financing was delayed between 2009-2013 (Figure 7). The exception to this was Southern Province which continued to show a decline in malaria cases due to the implementation of additional interventions to generate evidence for 'accelerating' malaria transmission reduction in 2011.

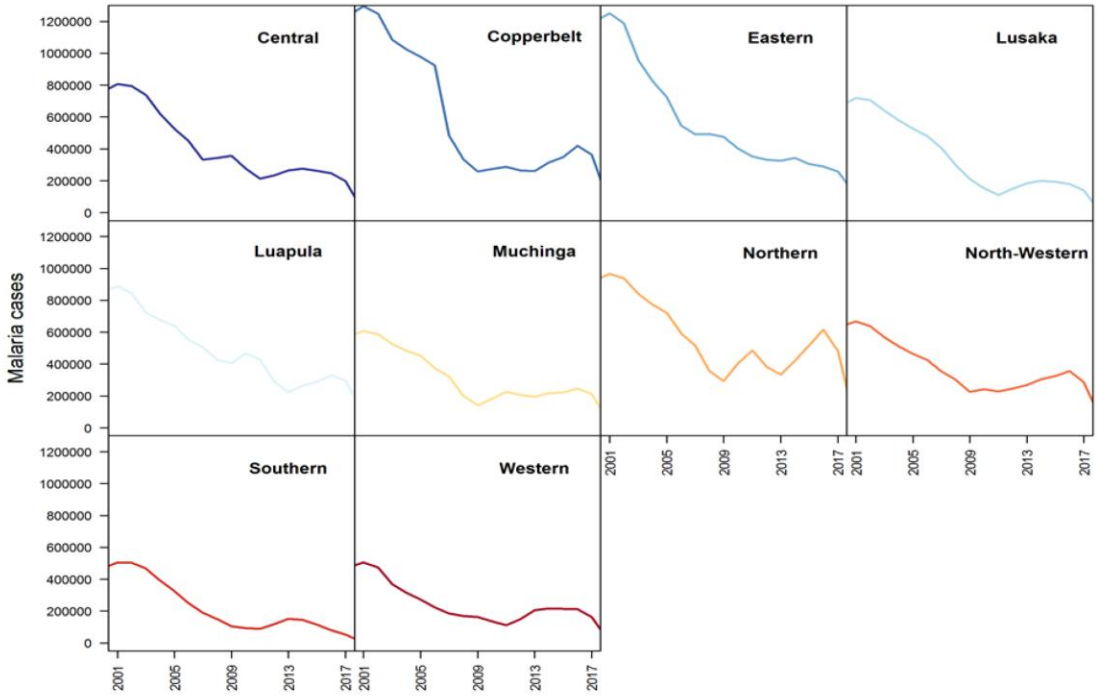

Figure 7. Malaria cases 2001-2017) in the 10 provinces in Zambia (GRZ/MOH, 2018)

Health and malaria financing

Malaria is currently financed through a combination of resources from the Global Fund (45%), government (30%) and the United States President's Malaria Initiative (Figure 8). Since its inception, Zambia has received USD 222.7 million in Global Fund financing. The 2017-2019 allocation amounted to USD 69 million. During the period 2014-2016, only 63% of the USD 75.5 million needed as outlined in the

NSP was funded. Although government contribution increased to over 25 million in 2017, the NMEC predicts a financing gap of about USD 150 million between 2019-2021.

In general, expenditures on health make up 5.4% to 6.6% of the GDP, which translates to approximately USD 28 per capita. The entire Zambian health sector is highly supported by external donors, bilateral and multilateral assistance projects. Efforts are currently in place to develop a health care financing strategy. In 2017, the National Health Insurance Act was enacted by the Parliament of Zambia, intended to provide financing for a national health system for universal access to healthcare services in Zambia. Once implemented, the act will establish a National Health Insurance Scheme and provide for its systems, procedures, and operations (USAID/PMI, 2019).

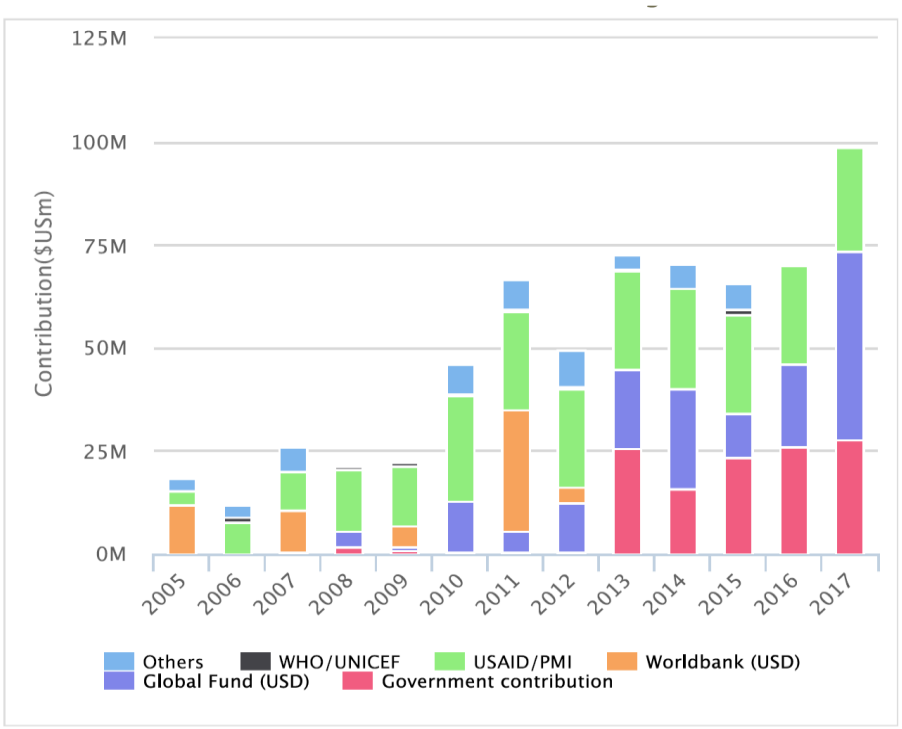

Figure 8. Breakdown of financing for malaria in Zambia (2005-2017) (WHO, 2018)

Healthcare is in Zambia is financed through public tax, external donors, community grants and direct payments by households. The GRZ collects taxes on alcohol 60-125% but these are currently not earmarked for health (ZRA, personal communication). There are no taxes on tobacco products, however, the Ministry of Finance is considering introducing a sin tax on these products.

The economic consequences of malaria

Research shows that malaria can negatively affect macroeconomic performance, and is a determinant of economic growth in the long term. The growth rate of the gross domestic product (GDP) per capita in malaria-endemic countries is 0.25-1.3 percentage points lower than in countries without malaria. Over a period of 25 years, GDP per capita growth in countries not affected by malaria was over five times higher than in countries affected by a heavy malaria burden (Gallup & Sachs, 2001).

Economic consequences to the corporate sector include reduced revenue due to reduced productivity when workers are absent due to illness or caring for sick family members. Direct financial costs are incurred increased healthcare spending from malaria cases and deaths. The disease can also impact business indirectly due to the effect it can have on the local economy through the deterioration of human capital, the loss in savings, investments and tax revenues and the reduction in other public health budgets due to increased expenditure on malaria (RBM, 2011). A 2006 report published by the Global Health Initiative of the World Economic Forum found that 72% of companies polled in sub-Saharan Africa reported a negative malaria impact, with 39% perceiving this impact to be serious (RBM, 2011b). By reducing malaria incidence, companies are able to enjoy greater operational efficiencies, which can support efforts to increase market share and profits. Community benefits from improved health and related economic benefits can also further increase consumer buying power, and therefore boost long-term business markets.

Reducing the burden of malaria also decreases inequity and contributes to the creation of more cohesive, stable societies, which can attract international investors and trade, and help to make growth more inclusive and sustainable. Furthermore, eliminating malaria enables the safe movement of people across regional and country borders, which brings benefits for economic development zones and tourism (Purdy, 2013; RBM, 2008).

Malaria also affects negatively affects cognitive development. An examination of the effects of malaria on female educational attainment in Paraguay and Sri Lanka found that a 10% decrease in malaria incidence can lead to 0.1 years of additional schooling, and increases the chance of being literate by 1-2 percentage points (Bleakley, 2013; Lucas, 2010).

The role of the private sector in malaria elimination

The role of the private sector in malaria elimination is well recognized. The scope of its contribution may include research, development and the production of a range of malaria commodities; driving of innovation; strategic, technical and logistical expertise; direct delivery of malaria services; facilitating access to corporate partnerships, fora and clients; as well as direct resource provision.

Examples of private sector support for malaria elimination may include (RBM 2018):

- The development and distribution of malaria commodities
- Partnerships with national programs to address malaria in the community including health and vector control research, policies, and services including malaria surveillance
- Advocacy and political diplomacy
- Local market insight, advertising know-how and existing contact networks which, coupled with marketing and strategic communications expertise, can facilitate and benefit malaria awareness campaigns or social marketing efforts.
- Support with operations, such as medicine distribution or data collection or surveillance
- Employment generation and economic productivity, particularly where commodity producing companies are located in endemic countries.
- Financing for malaria control and elimination, particularly as a component of domestic resource mobilization including the development of innovative financing mechanisms, which can help countries to meet co-financing requirements by donors.

In a survey of CSR activities conducted in the United Kingdom, a positive relationship was reported between corporate social performance and financial performance (Margolis & Walsh, 2001).

A 2018 survey of over 250 companies with an aggregate revenue of USD 11.3 trillion, reported corporate social investments of USD 23.8 billion with a median total giving of USD 19.2 million (CECP, 2018). Adding other medium and smaller enterprises, this number is likely to be close to USD 40 billion (authors estimates). The impetus behind these social investments varies from commercial interest to simple philanthropy and personal interest. Key drivers may include:

- **Commercial interest.** An obvious motivator is commercial interest from companies that manufacture products used for malaria diagnosis, treatment and prevention.
- **Productivity.** Many companies are motivated by the business case for malaria prevention in employees particularly when their operations are located in an endemic area and the company suffers from productivity losses due to employee absenteeism.
- **Corporate social responsibility/philanthropy**. Aided by social media, there appears to be increasing social capital attached to philanthropic efforts by large companies globally. Many companies engage in malaria focused activities in catchment communities from a philanthropic motivation as a show of good citizenship, although benefits from the marketing opportunity often act as complementary drivers.
- **Marketing and company positioning**. Companies are often motivated if positioned as a high-profile issue garnering media and political attention which may them with provide leverage in other aspects of the business. Some companies also consider CSR as an important part of a risk management strategy for maintaining and enhancing their reputation.
- **Tax incentives**. Many governments offer tax incentives to companies for donations or social activities. As soon as a company engages in charitable projects, a certain portion of its gross total income becomes exempt from taxes.
- **Network generation**. Particularly at a national level, engaging in high profile activities may provide business leaders with access to celebrities or political figures through which they can expand their market.
- **Personal interest**. Personal drive can be strong motivators for national level champions, company leadership and high net worth individuals. These are often instigated through encouragement via personal networks.

There are currently no policies governing CSR activities in Zambia. Several other countries in sub-Saharan African have CSR activities indirectly regulated or compelled by good policies and laws. For example, the South African Government plays an active role in influencing and regulating CSR. The country has developed corporate governance guidelines and standards for good governance and their adoption is highly recommended. The Johannesburg Stock Exchange, for example, requests listed companies to comply with these or otherwise justify why they are not adhering to them. Similarly, in Ghana, although there is no law on CSR, the government has instituted a variety of policies, laws, practices and initiatives that together provide the CSR framework in the country (GTZ, 2009).

At the same time, there are a number of barriers to private sector engagement in malaria efforts. Many of these stem from a low awareness of the potential scope of private sector contributions; ineffective public and private sector collaboration; a lack of a specific or tailored business case, including a failure to see the links between malaria and business operations; an acceptance of malaria as an unsolvable and

perennial problem; and an over-reliance on treatment through health insurance that does not include coverage for prevention interventions.

An understanding of companies' motives for investing in malaria control and elimination including potential facilitators and barriers can help to design an effective engagement strategy and advocacy campaign for the private sector.

Study findings

The private sector in Zambia has a long history of providing malaria prevention and treatment services to employees as part of a healthcare package. Others have provided the NMEC and Provincial Health Offices (PHO) with direct as well as in-kind donations or logistical support for malaria activities for example, many of the copper mining companies in the Copperbelt Province provide in-kind support for distribution of malaria commodities particularly during mass LLIN campaigns. Annex 2 outlines CSR activities in health, education and wellness being carried out by known private sector partners in Zambia including malaria activities. 17 of the 26 private sector companies are involved in malaria activities including community-based programs, training, provision of IRS, LLINs, larval source management, entomology surveys, screening and case management to employees. These companies employ a total of about 40,000 full time staff and 50,000 contractors.

Background information on businesses sampled for interviews

Table 4. Select information on businesses sampled

# businesses sampled	21
# employees in businesses sampled	~ 18,000
# business currently partnered with NMEC and/or PHO	10
# businesses in Zambia	*PACRA*: 171,203 local businesses 1920 foreign registered businesses *ZAACI*: 12,000 businesses, 62 Corporate members 8 Academia members, 25 chambers and 7 associations

Qualitative findings

Table 5. Summary of qualitative findings

		Percentage responses
Activities currently being carried out in support of malaria control/elimination	• On-site clinics for staff • Referral for complicated cases • Treatment for families at nearby government facilities • IRS at manufacturing sites and in employee homes • Assistance to provincial office to distribute nets	NA
Motivators for businesses to invest in malaria	• Employee absenteeism due to illness • Wellbeing of employees • Employee and community loyalty • Cost of prevention less than treatment • Time lost for funerals • Cultural	95% 48% 48% 40% 24% 19%
Measurement of returns on investment?	• Not quantitatively	
Current levels of collaboration with NMEC and Ministry of Health	• Would like more involvement/collaboration at the work planning stage	95%

		Percentage responses
Advocacy organizations of influence	• ZAACI • Chamber of Mines • Chamber of manufacturing and industry • Zambia Federation of Employers	
Further incentives needed from government	• Capacity building and training • More partners • Pooled procurement and lower pricing for procurement of products • Citizenship awards • Tax incentives	95% 95% 48% 100% 100%
Detriments to higher levels of investment	• New sales taxes will hurt profits making less resources available for CSR	
What can private sector offer towards malaria elimination goal	• Trucks for transport logistics/distribution of commodities • Messaging in communities	95% 95%

All the businesses interviewed expressed the view that malaria was a significant health problem in their catchment communities and that employee absenteeism due to malaria affected their businesses through reduced employee productivity, reduced business outputs and increased operational costs (through high medical expenses). They also indicated that worker absenteeism often required the need for contract workers who did not have the same level of training and competency as the permanent staff which distorted their timelines and targets.

"Malaria is a major problem. Staff can be out for 2 to 10 days. Even when they return. they are not 100%"

Despite knowing that malaria is a detriment to production, few actually quantified the economic effect of the illness on their business. Most companies do not have policy documents on CSR but others such as Kansanshi (FQML) have a department with officers responsible for Corporate Social Responsibility and Sustainability. Chambeshi Metals engages in evaluation and assessment of their CSR activities and these are presented to the board of the company, Chamber of Mines and feedback from the customers and community the ones who they service. Only few companies provided their CSR expenditure and none had done any cost and benefit analysis.

When asked whether current levels of collaboration with the government were adequate, most responded that they would like better coordination of activities and collaboration. All the businesses interviewed mentioned that they would benefit from government conducted trainings particularly for IRS and other activities. Technical expertise is often required to execute a project which is often not made readily available.

"The government regularly conducts trainings for public sector staff in the same communities as the businesses but these do not include the staff hired by the private sector"

They were of the opinion that they were only invited to select events particularly related to resource mobilization and were not included in the overall national and provincial strategy. Many

recommendations that have been made are not followed up with action and there is limited data transfer between the national and peripheral levels.

"The government needs to think of us as a partner. Just because we are the private sector don't think of us just for money"

Letters are sent to companies asking for contributions but the companies are not routinely involved in the planning.

"They should personalize the requests and ask for input, rather than just send generic letters"

With respect to challenges experienced that deterred by private sector investment in malaria all the businesses mentioned the incoming sales tax as a major challenge impacting trade agreements. The various Chambers of Commerce are not proactive enough with advocacy to create a more enabling environment for businesses. The MOH has a PPP office to coordinate activities with the private sector but this appears to be nascent (Nyambe, 2015) and little information and action is realized Those interviewed were of the opinion that there was little understanding at the national level of the detailed malaria activities private sector entities were engaged in. There also appears to be a lack of a link and coordination of various CSR concepts and initiatives with health.

"The National HIV/AIDS council has a mapping of what all the companies are doing in HIV/AIDs in the country. There is no such mapping for malaria. We also do not know what the other businesses are doing"

Due to the recent changes in tax structure, the companies reported that the cost of doing business in Zambia is increasing and is likely to reduce the amount of resources available for CSR and in turn, malaria. For example, one of the mining companies recently redirected their investment for Zambia to Panama.

"The non-refund of the company's input VAT by the Zambia Revenue Authority has led to critical cash flow constraints resulting in cost reduction measures which have resulted in the suspension of CSR spending"

The Government offers no incentives to the private sector to invest in health in communities. Businesses including mines pay land taxes but the government does not provide the needed services to the community. Local authorities are not resourced as taxes do not seem to trickle down to the peripheral levels.

"Government authorities are giving plots to citizens in mosquito infected areas which will increase malaria transmission without first draining the swamp areas in townships"

A major challenge with the government is the lack of planning and coordination. Unsolicited requests often compete with a company's planned interventions. Businesses receive requests for support from different government levels at different times. In some cases, they received requests from district commissioners every month. There is a need coordination of requests tied to an annual workplan with budget lines. These plans need to start in November prior to the fiscal year that begins in June.

"The Government has not presented a comprehensive plan with a needs and gap assessment by province/district to the private sector as well as a timeline of activities. Some planning was done for IRS before the last spaying campaign but not for other interventions"

Another major challenge is the price of the commodities, particularly the newer insecticides.

"The price of the chemicals, especially Actellic® makes expansion of activities difficult"

The businesses were of the opinion that the government should consider alternative insecticides for IRS or invite the businesses to participate in a pooled procurement system to allow all stakeholders to benefit from lower prices.

Respondents were of the opinion that the community sometimes had unrealistic expectations. Although they have genuine needs, there is the notion that private companies always have funds to undertake CSR. For example, many communities expect the company to sponsor their funerals or even build roads.

"We do not and must not be assumed to take the place of public institutions"

Respondents also observed a lack of commitment by some beneficiaries towards development initiatives. Some beneficiaries are not fully committed towards ensuring that the project succeeds to their benefit. Local Councils in the mining area operations play a very limited role, often only present at the handover ceremony. There is also inadequate support from fellow Corporate partners, communities and Government. Requests made by some officials are sometimes of a political nature. Companies are sometimes approached by Government officials for donations that to use as part of their campaign without consideration to geographical need.

Similar challenges are experienced in other countries (GTZ, 2009) including getting the interest and attention of companies due to fragmentation of responsibility of CSR within structures and constraints of CSR practitioners. Financial constraints in companies, community groupings and organizations, as well as the public sector often hinder the implementation of CSR initiative at all levels. Co-operation across public sector ministries, business sectors and community interest groups are a universal challenge due to different understanding and/or political interests/intentions regarding CSR, within the sectors. The report also found a strong bias towards philanthropic and sponsorship activities as opposed to a wider definition and engagement in CSR. Many corporate still view their CSR activities as part of their competitive advantage which makes it near impossible to share experiences, best practices, policies and even resources.

The businesses had several opinions on incentives or motivators for continued or increased investments in malaria elimination. An official recognition by the government for the work being done on malaria was considered to be a strong motivator particularly if received by a high office in the government. Awards from chambers commerce or associations could also be motivators, although some of these already exist. The Zambia Chamber of Mines has an annual Safety and Health conference (SHE) in late October (31 October – 2 November, 2019) with awards being presented by the Minister of Mines. ZAACCI and ZRA also present 13 awards at end of year at a gala dinner which could be an opportunity to spotlight a company supporting the Governments malaria elimination efforts.

A discussion with the outdoor advertising company, G, Rutherford, who have 900 billboards nationwide raised the possibility of subsidized pricing for public health issues in Zambia is in turn the local city councils would reduce their ground rates for billboard placement (Lusaka and Ndola city councils).

Respondents already undertaking CSR were of the opinion that it was increasingly important to a company's competitiveness providing benefits in terms of risk management, cost savings, access to capital, customer relationships, human resource management, and innovation capacity. Relationships are strengthened and market share expanded. It also encourages more social and environmental responsibility from the corporate sector at a time when the crisis has damaged consumer confidence and the levels of trust in business.

Several respondents believed that CSR should not always be driven by financial motives.

"It is not always easy to link CSR spend to a financial return"

There was some dissonance on opinions on whether or not CSR activities should be made mandatory in the business operations. Some believed that every industry in Zambia should implement CSR and it should be one of the mandatory conditions embedded in the licenses/agreements to all investors willing to set up businesses in Zambia, based on profit margins, particularly multinational companies.

Many were of the opinion that most companies would engage in CSR if tax benefits were to be provided to companies engaging on social development. Most were in favor of establishing one fund basket from which CSR activities can be funded with a view of serving a wider community. This should benefit the entire country. Currently peripheral communities benefit little from activities being undertaken.

"It is better if other communities away from these resources also benefit from the CSR investment"

Other ways that were identified that the private sector could contribute was logistics support particularly in the supply chain as well as having CEOs playing an ambassadorial role for malaria.

Respondents were of the opinion that there needs to be a national policy on CSR and that CSR activities be reviewed and audited against their impact on yearly basis. It must emanate, among other reasons, from an awareness of the link and impact between business and socio-economic needs tailored to the community context. These findings are consistent with a report on CSR in the mining industry (Nyambe, 2015). Respondents believed that the Government need to initiate deliberate policy on incentives to benefit companies engaged in CSR to promote and encourage more companies to undertake CSR activities. Figure 9 summarizes the drivers for investing in CSR as identified in this study.

Internal drivers	External drivers
•Commercial interest •Productivity •Philanthropy •Cultural/community development •Market access/positioning •Crisis response	•Taxes and other incentives •Network generation •Political capital •Personal interest •Stakeholder advocacy •Social recognition

Figure 9. Internal and external drivers of CSR identified by respondents

Quantitative findings

Input data used in the quantitative analysis is summarized in table 2 in the methodology section of this report. The sections below are the summary results of the quantitative analysis.

Private sector employees and daily productivity by province

Table 6. Employees, income and productivity in the private sector by province

Province	Average monthly HH income	# HH	Daily income in all households (USD)	Total # employees	Employees in private sector	Average income (USD)	Income/ private sector employee USD	Product-ivity per day
	A	B	A*B = C	D	D*95%=E	C/(D/B)=F	F/D=G	G*(5395 0/10)=H
	LCMS 2015 (Kw)	CSO 2018		CSO 2018	(95% of total employed in private sec.)			GVA: 53,950
Central	1530	324,635	1,839,598.33	338,116	321,211	1,766,250	5.50	25.31
Copperbelt	3228	494,231	5,908,806.18	721,239	685,177	4,049,028	5.91	25.72
Eastern	1015	406,585	1,528,458.43	317,056	301,203	1,960,061	6.51	26.32
Luapula	836	236,929	733,602.39	193,726	184,039	897,205	4.88	24.69
Lusaka	2893	638,351	6,839,812.75	1,006,816	956,475	4,336,642	4.53	24.35
Muchinga	1201	185,492	825,095.90	164,802	156,562	928,683	5.93	25.75
Northern	896	286,236	949,879.47	220,723	209,687	1,231,814	5.87	25.69
North Western	1413	166,131	869,418.90	167,699	159,314	861,291	5.41	25.22
Southern	1370	436,886	2,216,791.93	339,785	322,796	2,850,287	8.83	28.64
Western	882	206,656	675,076.27	151,437	143,865	921,233	6.40	26.22
Total	**15264**	**3,382,132**	**22,386,540.53**	**3,621,398**	**3,440,328**	**19,802,494**	**5.76**	**22.97**

Table 6 shows that of the 3.6 million Zambian employed, 95% (3.4 million) are employed in the private sector. The income per private sector employee varied from USD 4.53 per employee in Lusaka to USD 8.83 in the southern province with an average national level income of USD 5.76. Average national daily productivity of employees in the private sector is USD 22.97.

Malaria cases in private sector employees and families

Table 7. Malaria cases in employees and families by province

	Malaria cases (confirmed)	Cases in >15 (confirmed)	Malaria cases (suspected)	Cases-private sector employees (confirmed)	Cases-private sector employees (suspected)	Cases in families[6] (confirmed)
	I	J	K	L	M	I-M=N
	NMEC	NMEC	NMEC			
Central	552,548	198,917	938,148	52,492	98,370	500,055
Copperbelt	954,816	343,734	1,621,142	90,707	169,986	864,108
Eastern	995,437	358,357	1,690,112	94,567	177,218	900,870
Luapula	796,773	286,838	1,352,807	75,693	141,849	721,079
Lusaka	90,779	32,680	154,130	8,624	16,161	82,155
Muchinga	465,464	167,567	790,291	44,219	82,866	421,244
Northern	596,955	214,904	1,013,545	56,711	106,276	540,244
North Western	779,079	280,469	1,322,767	74,013	138,700	705,066
Southern	54,790	19,724	93,026	5,205	9,754	49,585
Western	677,877	244,036	1,150,940	64,398	120,683	613,478
Total	**5,964,518**	**2,147,226**	**10,126,907**	**566,629**	**1,061,863**	**5,397,888**

The total annual number of confirmed malaria cases in private sector employees was 566,629. Suspected malaria cases in employees were 10,126,907. The number of cases in families of the employees and the surrounding communities that would have an impact on the private sector was 5.4 million.

Impact of malaria on the business revenue in Zambia

Table 8 illustrates the derivation of the total cost of lost productivity due to malaria using data on malaria cases in the private sector employees (M), cases in families (N), days absent due to malaria, incomes (G) and productivity per employee (H) in each of the provinces. Employees lost a total of 16.3 million days annually due to malaria, translating to about USD 270 million in productivity losses. When factoring in presenteeism, the total losses amounted to USD 296.5 million.

[6] Given that the vast majority of the population in Zambia works for the private sector either directly or indirectly through contractors, we assumed that all the remaining cases (minus the 5% of employees in the public sector) will directly or indirectly affect Zambian businesses.

Table 8. Employees, income and productivity in the private sector by province

	Days absent due to confirmed malaria	Days absent due to suspected malaria	Days absent due to caretaking	Productivity loss	Replace-ment cost of worker	Present-eeism (product-ivity reduced by 50% for 6 days after return to work)	Total cost of lost productivity due to malaria (USD)
	J*4=O	K*1=P	N*2.5=Q	((O+P+Q)*H *0.53)+((O+ P+Q)*0.47* G)=R	(O+P+Q)*. 0.47*G=S	O*H*0.5=T	R+S+T=U
Central	209,968	45,878	1,250,139	21,243,418	3,221,838	2,370,389	26,835,645
Copperbelt	362,830	79,278	2,160,270	37,593,917	5,983,259	4,157,768	47,734,945
Eastern	378,266	82,651	2,252,177	40,536,286	6,869,007	4,428,277	51,833,570
Luapula	302,774	66,156	1,802,698	29,511,793	4,118,931	3,339,938	36,970,662
Lusaka	34,496	7,537	205,388	3,292,523	436,452	375,661	4,104,635
Muchinga	176,876	38,647	1,053,112	18,350,068	2,927,774	2,028,503	23,306,345
Northern	226,843	49,565	1,350,611	23,456,861	3,718,658	2,596,178	29,771,697
North Western	296,050	64,687	1,762,667	29,790,136	4,466,297	3,330,859	37,587,292
Southern	20,820	4,549	123,963	2,518,274	513,019	263,752	3,295,045
Western	257,593	56,284	1,533,697	27,445,537	4,602,937	3,004,501	35,052,974
Total	**2,266,517**	**495,234**	**13,494,721**	**233,738,813**	**36,858,171**	**25,895,827**	**296,492,811**

Table 9 illustrates the computation of the revenues gained from malaria elimination due to reduced expenditure in the public sector which may be potentially redirected to consumer spending in the private sector. In this case, the total productivity was USD 397 million.

Table 9. Employees, income and productivity in the private sector by province without replacement labor

	Days absent due to confirmed malaria	Days absent due to suspected malaria	Days absent due to caretaking	Productivity loss	Present-eeism (product-ivity reduced by 50% for 6 days after return to work)	Total cost of lost productivity due to malaria (USD)
	J*4=O	K*1=P	N*2.5=Q	((O+P+Q)*H *0.53) =R	O*H*0.5=S	R+S=T
Central	209,968	45,878	1,250,139	34,002,983	2,370,389	36,373,372
Copperbelt	362,830	79,278	2,160,270	59,642,750	4,157,768	63,800,518
Eastern	378,266	82,651	2,252,177	63,523,167	4,428,277	67,951,444
Luapula	302,774	66,156	1,802,698	47,911,059	3,339,938	51,250,997
Lusaka	34,496	7,537	205,388	5,388,814	375,661	5,764,475
Muchinga	176,876	38,647	1,053,112	29,098,669	2,028,503	31,127,172
Northern	226,843	49,565	1,350,611	37,241,893	2,596,178	39,838,071
North Western	296,050	64,687	1,762,667	47,780,828	3,330,859	51,111,687
Southern	20,820	4,549	123,963	3,783,500	263,752	4,047,252
Western	257,593	56,284	1,533,697	43,099,246	3,004,501	46,103,746
Total	**2,266,517**	**495,234**	**13,494,721**	**371,472,909**	**25,895,827**	**397,368,736**

As illustrated in table 10, the annual cost savings from malaria elimination will be 66.96 million. The proportion of these savings from the government budget amount to USD 33.5 million as the remaining is financed through external finances. As portion of these savings (% from PAYE and corporate taxes) is likely to get redirected to the private sector when malaria is eliminated in the form of consumer spending, estimated at USD 6.2 million.

Revenues are also lost due to malaria mortality. The full-income approach was used to obtain the economic impact of these deaths on the economy, resulting in an estimated loss of about USD 27 million.

Table 10. Revenues gained from malaria elimination in the private sector

Malaria budget re-directed to private sector from public sector savings	
Average annual cost of malaria elimination (2019-2021)	111.60 million
Cost savings from elimination	66.96 million (60%)
Malaria budget from domestic sources (annual)	33.5 million (30%)
Cost savings from elimination from domestic budget (total)	20 million
% of domestic budget from PAYE and corporate taxes	31%
Malaria budget re-directed to private sector	6.23 million (622,728 per province)
Revenues due to premature deaths averted	
# total deaths	1150
# deaths in adults	449
Revenue due to deaths in private sector	Deaths x years of life lost x 4.2 x GDP
Revenue due to deaths in private sector	USD 27.3 million USD 2.73 million per province)

Table 11 depicts the direct costs due to malaria incurred by the private sector. Fixed costs (for example, infrastructure costs) are not expected to change when malaria endemicity declines and thus are not included. The total cost of malaria treatment and prevention was estimated at about USD 15.2 million. Out of pocket expenditures were estimated at USD 2.2 per household amounting to a total of USD 88 million.

Table 11. Direct variable costs due to malaria

	Cost of IRS	**Cost of diagnosis**	**Cost of treatment**	**Total direct cost (USD)**	**OOP expenditures (USD)**
	10% of formal private sector households	all employees and families (5 people per family)	all employees and families		USD 2.2 per HH
Central	12487	541,035	656,150	1,209,672	8,440,510
Copperbelt	26635	934,922	3,294,114	4,255,671	12,850,006
Eastern	11709	974,697	1,182,082	2,168,488	10,571,210
Luapula	7154	780,172	946,167	1,733,494	6,160,154
Lusaka	37182	88,888	107,800	233,869	16,597,126
Muchinga	6086	455,766	552,738	1,014,590	4,822,792
Northern	8151	584,517	708,884	1,301,553	7,442,136
North Western	6193	762,847	925,157	1,694,197	4,319,406
Southern	12548	53,649	65,063	131,260	11,359,036
Western	5593	663,754	804,979	1,474,326	5,373,056
Total	**133,738**	**5,840,247**	**9,243,135**	**15,217,120**	**87,935,432**

Table 12 summarizes the costs and revenue losses due to malaria to businesses in Zambia. An income multiplier was used to account for the rollover effect increased consumer spending as described in the methodology section. Total economic losses to the private sector were estimated at USD 606 million when accounting for replacement labor and USD 748 million without this assumption.

Table 12. Summary of total costs and revenue losses due to malaria to businesses (with income multipliers)

Province	a. Productivity lost with replacement labor	b. Productivity lost wo replace-ment labor	Death and other direct costs	Indirect cost and loss of revenue	Total cost and loss of revenue with replacement labor)	Total cost and loss of revenue wo replacement labor)
Central	37,569,903	50,922,720	5,517,893	12,688,533	55,776,329	69,129,147
Copperbelt	66,828,923	89,320,726	9,782,291	18,861,828	95,473,041	117,964,845
Eastern	72,566,999	95,132,022	6,860,235	15,671,513	95,098,747	117,663,771
Luapula	51,758,927	71,751,396	6,251,243	9,496,035	67,506,204	87,498,674
Lusaka	5,746,490	8,070,265	4,151,769	24,107,796	34,006,054	36,329,830
Muchinga	32,628,883	43,578,041	5,244,778	7,623,728	45,497,389	56,446,547
Northern	41,680,376	55,773,299	5,646,526	11,290,810	58,617,712	72,710,635
North Western	52,622,208	71,556,362	6,196,228	6,918,988	65,737,424	84,671,578
Southern	4,613,064	5,666,153	4,008,116	16,774,470	25,395,649	26,448,738
Western	49,074,164	64,545,245	5,888,408	8,394,098	63,356,670	78,827,750
Total	**415,089,936**	**556,316,230**	**59,547,488**	**131,827,797**	**606,465,220**	**747,691,514**

Costs and revenues were extrapolated to 2029 to obtain the total costs of elimination over 10 years and the total revenues that would be accrued by businesses as a result of elimination (Table 13). The NPV of the costs and the revenues were estimated using standard economic techniques as illustrated in the methodology section. The costs were subtracted from revenues to obtain the net revenues.

To calculate the ROI, the total revenues and costs were summed to obtain the potential total revenue accrued and total cost incurred by the private sector between 2019-2029. This was done separately using the revenue losses using replacement workers and without and using both run rates and the NPV.

Table 13. Net present value of revenues and costs

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenue (productivity loss)				622,233,316	638,411,3812	655,010,078	672,040,340	689,513,389	707,440,737	725,834,196	744,705,885
Revenue (wo labor replace-ment)				576,357,245	537,584,122	501,419,372	467,687,523	436,224,908	406,878,869	379,507,017	353,976,545
Revenue (product-ivity loss (NPV)				767,131,494	787,076,912	807,540,912	828,536,976	850,078,937	872,180,990	894,857,695	918,123,995
Revenue (NPV) wo labor replace-ment)				467,493,100	436,043,564	406,709,724	379,349,252	353,829,393	330,026,325	307,824,554	287,116,357
NMEC financing gap	42,811,663	72,667,050	39,165,382	3,695,834	3,791,926	3,890,516	3,991,669	4,095,453	4,201,934	4,311,185	4,423,275
Baseline private sector spending	15,217,120	15,217,120	15,217,120								
Cost	58,028,783	87,884,170	54,382,502	3,695,834	3,791,926	3,890,516	3,991,669	4,095,453	4,201,934	4,311,185	4,423,275
Cost (NPV)	58,028,783	79,894,700	44,944,216	2,776,735	2,589,936	2,415,704	2,253,193	2,101,615	1,960,233	1,828,363	1,705,364
Revenue - Cost	(58,028,783)	(87,884,170)	(54,382,502)	618,537,482	634,619,456	651,119,562	668,048,67	685,417,936	703,238,803	721,523,011	740,282,620
Revenue - Cost (NPV)	(58,028,783)	(79,894,700)	(44,944,216)	464,716,365	433,453,628	404,294,020	377,096,059	351,727,778	328,066,091	305,996,191	285,410,992

$$\text{ROI} = \frac{\Sigma(\text{Revenue generated by elimination})}{\Sigma(\text{Cost of elimination (baseline funding spent + funding gap to be filled)})}$$

The findings indicate a robust return on investment of 15:1 using NPV and 22:1 using run rates with replacement labor.

$$\text{ROI} = \frac{2{,}968{,}392{,}268}{200{,}498{,}842} = 15{:}1$$

OR

$$\text{ROI} = \frac{5{,}455{,}189{,}323 - 200{,}498{,}842}{200{,}498{,}842} = 22{:}1$$

When using the revenue losses **without** replacement labor, the ROI was 18:1 using NPV and 29:1 using run rates.

$$\text{ROI} = \frac{3{,}659{,}635{,}600}{200{,}498{,}842} = 18{:}1$$

OR

$$\text{ROI} = \frac{6{,}725{,}527{,}912 - 200{,}498{,}842}{200{,}498{,}842} = 28{:}1$$

The return on investment for businesses investing in malaria elimination was therefore estimated at 15:1 (NPV) to 22:1 (run rate) using the assumption of 47% of replacement labor for employee absenteeism.

The return on investment for businesses investing in malaria elimination without replacement labor for employee absenteeism was estimated at 18:1 (NPV) to 28:1 (run rate).

Presenteeism was varied at 25 and 75% to determine the sensitivity of the findings to the assumption made on reduced productivity due to the hangover effect. Varying presenteeism between 25-75% changed the total revenues to business by ± 2-3%. Presenteeism therefore, used does not change the overall findings significantly.

Cost of a potential resurgence

Historical data illustrates that reducing funding has been associated with significant resurgences of malaria. Reversal to 2001 levels would result in an additional 2.5 million cases and over 8000 deaths resulting in a total loss of revenue of USD 1.08 billion to businesses in Zambia (Table 14).

Table 14. Cost of a resurgence scenario

# cases in resurgence scenario	8.0 million
# deaths in resurgence scenario	9369
Cost of resurgence	USD 0.83- 1.02 billion
Excess cases due to resurgence	2.58 million
Excess deaths	8,158
Excess cost of resurgence	227.9 – 275.3 million

Case study 1

First Quantum Minerals and malaria CSR[7]

First Quantum Minerals (FQM) operates two mines in Zambia, the Kansanshi mine and smelter and Sentinel located in Kalumbila and Solwezi, respectively. Copper gold and nickel are the main minerals mined. FQM has been involved with providing malaria intervention to its employees, their families and the community for 12 years. The company conducts targeted insecticide spraying – including indoor residual spraying (IRS) in people's homes. These efforts are coordinated with public sector spraying programs. The team also monitors the impact of spraying efforts to determine which insecticides are more effective and track health improvements against baseline studies – paying particular attention to harder to reach rural areas.

FQM is also involved in education and sensitization programs at the community level and provides support to the districts to distribute LLINs (distributed to rural health facilities in 2 districts in April 2019). First Quantum also sponsors research by the District Health Management Team and the Tropical Diseases Research Centre, including studies in entomology, insecticide effectiveness and the mapping of breeding sites. Health surveys were conducted in Kalumbila conducted in 2011, 2015 and will be repeated in June 2019.

These programs are complemented by a number of brick-and-mortar facilities providing primary care. The Kansanshi Mine Clinic in Solwezi serves employees and their dependents, as well as contractors – more than 20,000 people in total. At the Trident operation, about 800 people receive care from a newly opened clinic in Kalumbila. In Ndola, the Mary Begg Community Clinic serves about 1,500 FQM employees and their families, along with many community members within a population of nearly half a million.

First Quantum's prevention program has had a dramatic impact on the cost of health care delivery. In 2014–2015, during the peak of the malaria season, the clinics in Solwezi and Kalumbila saw case-loads reduced by 60% to 70% compared to previous years. At its peak, malaria affected more than three-quarters of the workforce, with a cost of USD 185,000 at the Trident facility alone. After the malaria management program was implemented, annual incidence plummeted to just 360 cases from a peak incidence of 7800 uncomplicated cases and costs declined to about USD 102,000. Annually, FQM spends about USD 300,000 on malaria prevention.

Other health activities are health roadshows, mass sensitization, screening, HIV, syphilis, BMI, BP, sugar levels, girls empowerment, sexual and reproductive health, and programs to keep girls in schools (27

[7] https://www.miningmx.com/news

schools in Kalumbila and 10 schools in Kansanshi). In addition, FQM helps strengthen public health services and implements mobile primary healthcare interventions with District Health Offices. In the 2014–2015 fiscal year, First Quantum's total annual expenditure on health-related programs in Zambia was $12.5 million.

Case study 2

Zambia Sugar Plc, Mopani Copper Mines and Konkola Copper Mines have invested in malaria control in Zambia since 2000. Zambia Sugar is one of Zambia's largest agricultural enterprises employing over 6000 people. Mopani Copper Mines Plc (MCM) is a copper and cobalt producer employing about 9000 full time equivalent worker and 13,000 contractors. Konkola Copper Mines is a copper and cobalt producer employing an estimated 3000 full-time workers and 6000 contractors. All there have widespread malaria activities for employees and the community in the catchment area. Between 2001 and 2017, annual malaria cases reported in company clinics declined from 14,000 to less than 1000 (Figure 10).

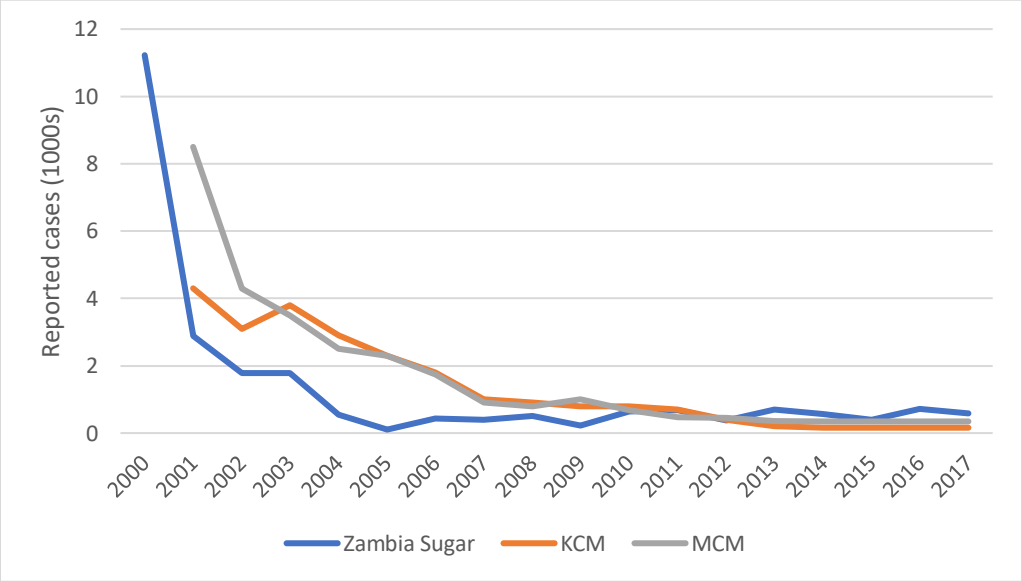

Figure 10. Reported cases (1000s) in company health clinics for Zambia Sugar, Mopani Copper Mines and Konkola Copper Mines 2000-2017

Recommendations

All companies were of the opinion that malaria was an economic burden and detrimental to business but none had measured it in economic terms. At the same time, businesses faced several challenges and received little in terms of incentives from the government for their corporate citizenship. Michael Spicer, CEO of the South Africa Foundation and former senior executive for the mining conglomerate Anglo American, argues that having CSR guided by the socio-economic priorities of the country or region is simply good business. Furthermore, he suggests that companies in developing countries have to actively shape the socio-economic and political landscape in order to create an operating environment which is conducive for business (Middleton, 2005).

The recommendations below stem from the interviews and discussions with key businesses:

1. The Government of Zambia needs to develop a **multi-stakeholder plan with businesses included as equal partners** in the malaria elimination strategy. For example, the Africa Comprehensive HIV/AIDS Partnership (ACHAP) established in 2001 as a formal partnership between Merck, Bill and Melinda Gates Foundation and the Government of Botswana aimed to develop and implement a national comprehensive HIV/AIDS strategy. The initiative includes capacity building and strategic planning, harness widespread private-sector expertise and is fully integrated with government strategy.
2. The Government of Zambia **needs a strong engagement and advocacy strategy with the private sector illustrating the robust economic returns of up to 28:1** that businesses can gain from partnering in the elimination strategy. In addition to articulating the robust return on investment, a stronger Zambian economy will increase consumer spending, boosting corporate returns even further.
3. There is a need for national strategy framework which explicitly recognizes the potential of CSR contributions and seeks to align these activities with development goals.
4. CSR activities against their impact should be reviewed and audited on yearly basis and form part of companies' annual reports.
5. The PPP department within the Ministry of Health needs to be strengthened. A clear **mapping of all stakeholders** currently involved in Corporate Social Responsibility for Health including malaria needs to be conducted.
6. There is a need for to create a platform under the leadership of ZACCI or various chamber, for example, the Chamber of Mines to map out what private sector resources are available to be utilized in the various districts and provinces. The chambers should create a forum to discuss how CSR can be sustained to benefit the Zambia economy
7. Given the recent bill on sales tax which is likely to affect revenues, corporations need other **incentives for investing in malaria**. There is already precedence in Zambia which reduced excise duty rates to produce a beer produced with locally sourced smallholder-produced sorghum rather than imported barley. Reductions on annual taxes in the form of tax credits may be attractive to companies investing in CSR activities, for example, a tax credit can be offered for reducing the financing gap for malaria. Several countries offer tax incentives for CSR including Great Britain and France.
8. Malaria/health commodities procured for the workplace should be VAT or sales tax exempt.
9. **Non-financial incentives** should also be explored including access to **capacity building** conducted by government for businesses already involved in malaria activities. Other incentives

include allowing businesses to access **favorable pricing from pooled procurement** of malaria commodities and other initiatives.

10. Many private logistics and transportation companies often have empty trucks traveling to areas in the country. The private sector may be approached to offer transportation services for malaria commodities at cost when this is likely to occur. This would reduce the need for having trucks on hand for distribution including LLIN campaigns.
11. To obtain favorable pricing for advertising, the program can approach the companies for using unleased boards under a CSR initiative. Lower land rates for billboards used for these purposes or other similar incentives by the local city councils should consider may provide added motivation to the private advertising companies.
12. **Corporate social responsibility awards** from the central government as well as from chambers and business associations should be explored as well as co-branding. While this is already being undertaken during World Malaria Day events and ZACCI annual meetings, a higher-level recognition with access to political figures may spur greater interest.
13. Abandoned pits and mines can serve as tourist attractions through geo-tourism
14. The private sector may be approached for setting up waste rock crusher plants to process building material for putting up structures and road construction
15. **Diaspora and remittances**. The Ministry of Foreign Affairs has recently developed a diaspora policy to engage Zambians abroad to contribute to the national development goals. In 2018, there were 502,368 inbound international remittances amounting to ZMK 1.45 billion (USD 91 million). This was in addition to ZMK 1 billion outbound and ZMK 45 billion in domestic remittances (bank of Zambia, 2019). A partnership with the companies handling the remittances (e.g. Western Union) through a CSR-type venture has the potential to raise enough funding to fill the financing gap for malaria. Early collaboration with the Ministry of Foreign Affairs and the companies managing the remittances will be needed to design a favorable structure which does not tax the receiver of the funds.
16. The government is considering **a sin tax on tobacco products**. Earmarking these for health, including malaria has the potential to fill the financing gap for malaria as well as the newly established national health financing scheme. In the Philippines, sin taxes on tobacco and alcohol generated USD 2.3 billion within two years of its passing and increased the Department of Health budget by 63% in 2015 compared to a 2013 baseline (Shretta, 2019).
17. Two very underutilized sectors for CSR including for malaria are **tourism and banking**. At the very least, hotels in malaria endemic areas can be approached to ensure that all the accommodation including staff accommodation is equipped with LLINs. Given that tourism revenues are likely to increase with malaria elimination, it would appear that this sector would be an interested stakeholder.
18. Other innovative financing mechanisms are the emergence of social and development impact bonds (SIBs and DIBs) that seek to mobilize private sector capital to fund proven social programs, with a promise to be paid back by the government if these programs successfully achieve desired social outcomes.
19. Companies interviewed favored the notion of a basket of funds into which they can contribute in lieu of uncoordinated requests from communities. This would allow for better planning with funds programmed early for activities for which there are anticipated gaps. A discussion is already underway within the EMC, although the design is yet to be developed.

Role of EMC

1. Support the Government of Zambia to develop an **advocacy strategy for the private sector.**
2. Advocate to the GoZ to develop a CSR strategy that rewards businesses for social investments in health including financial and tax incentives as well as CSR awards at high levels of political leadership.
3. Advocate for VAT or sales tax exemptions for malaria/health commodities procured for the workplace
4. Advocate for **non-financial incentives** including access to **capacity building**. In addition, advocate for **favorable pricing from pooled procurement** of malaria commodities and other initiatives.
5. **Collaborate with diaspora and remittance managers**: Develop partnerships with companies handling the remittances (e.g. Western Union) through a CSR-type venture to raise funding to fill the financing gap for malaria.
6. Advocate for the use of **sin tax on tobacco and other products to** be earmarked for health.
7. Collaboration with the tourism and travel industry to increase coverage and use of LLINs.
8. Develop a malaria fund "basket" into which companies can contribute either directly e.g. an endowment fund. The "basket" can be further resourced through innovative funding models such as health bonds.
9. Appoint influential ambassadors (appoint to the EMC) in the private sector to act as champions to advance malaria elimination efforts.

Glossary

Term	Definition
Benefit-cost ratio (BCR)	The benefit of an activity per dollar of cost. Benefit-cost ratios (or alternatively cost-benefit ratios) are frequently estimated for many forms of government spending, as well as a growing number of business investments.
Gross Domestic Product (GDP) PPP	GDP per capita (PPP based) is gross domestic product converted to international dollars using purchasing power parity rates and divided by total population
Gross Domestic Product (GDP) Real	The total market value, measured in constant prices, of all goods and services produced within the political boundaries of an economy during a given period of time, usually one year
Gross Value Added (GVA)	Gross value added is the measure of the value of goods and services produced in an area, industry or sector of an economy. In the national accounts GVA is the output minus intermediate consumption
Income multiplier	The concept of the income multiplier refers to the theory that a dollar spent turns into more money due to onward spending
Net Present Value (NPV)	Net present value is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used to analyze the profitability of a projected investment or project
Return on Investment (ROI)	The ratio of the additional annual income or profit generated by an investment to the cost of the investment
Run rate	The run rate refers to the financial performance based on using current financial information as a predictor of future performance. The run rate functions as an extrapolation of current financial performance and assumes that current conditions will continue

References

1. Abeyasinghe RR, Galappaththy GNL, Smith Gueye C, Kahn, JG, Feachem RGA, 2012. Malaria control and elimination in Sri Lanka: documenting progress and success factors in a conflict setting. *PLoS One* 7: e43162.
2. CECP. 2018. *Giving in numbers*. Chief Executives for Corporate Purpose. 2018 edition. https://cecp.co/home/resources/giving-in-numbers/.
3. Central Statistical Office, Ministry of Health, Tropical Diseases Research Centre and University of Zambia. 2014. *Zambia Demographic and Health Survey 2011*. Calverton, Md, Central Statistical Office and Macro International.
4. Bleakley H. 2003. Disease and development: evidence from the American south. *J Eur Econ Assoc*. **1**:376–86.
5. Bank of Zambia. 2019. https://www.boz.zm/payment-systems-statistics.htm.
6. http://zambia.opendataforafrica.org/gadkijf/labour-statistics
7. Chikuba, Z, Syacumpi, M, and Thurlow, J. 2013. *A 2007 social accounting matrix (SAM) for Zambia*. Institute for Policy Analysis and Research, Lusaka, Zambia, and International Food Policy Research Institute, Washington DC.
8. Chizema EK, Miller JM, Steketee RW, Mukonka VM, Mukuka C, Mohamed AD, Miti SK & Campbell CC. 2010. Scaling up malaria control in Zambia: progress and impact 2005-2008. *Am J Trop Med Hyg.* **82**:3.
9. Clarke, George R.; Shah, Manu Kedia; Sheppard, Marie; Munro, Juliet; Pearson Jr., Roland V. 2010. *Zambia - Zambia Business Survey: The profile and productivity of Zambian businesses,* Washington, DC: World Bank. http://documents.worldbank.org/curated/en/949481468170956721/The-profile-and-productivity-of-Zambian-businesses.
10. Conway P & Shah MK. 2010. *Who's productive in Zambia's private sector? Evidence from the Zambia Business Survey*, June 2010. http://siteresources.worldbank.org/INTAFRICA/Resources/zambia_biz-survey.pdf.
11. Doppelmayr. 2009. Economic impacts of tourism in the Livingstone area, Zambia. Unpublished report.
12. Lucas AM. 2010. Malaria eradication and educational attainment: evidence from Paraguay and Sri Lanka. *Am Econ J Appl Econ*. **2**:46–71.
13. Gallup JL, Sachs JD. 2001. The economic burden of malaria. *Am J Trop Med Hyg*.; **64**(1–2 Suppl):85–96.
14. GRZ/MOH. 2017. *National malaria elimination strategic plan 2017-2021: Moving from accelerated burden reduction to malaria elimination in Zambia*. Jan 2017. National Malaria Elimination Centre: Lusaka
15. GRZ/MOH. 2018. *National malaria elimination business plan 2018-2020*. April 2018. National Malaria Elimination Centre: Lusaka
16. GTZ, 2009: Corporate Social responsibility in sub-Saharan Africa, A survey on promoting and hindering factors. Report. 121p.

17. ICCM. 2014. *Enhancing mining's contribution to the Zambian economy and society*. Mining: Partnerships for Development. April 2014. International Council on Mining & Metals, London. 146p.

18. Inambao AB, Kumar R, Hamainza B, Makasa M, Nielsen CF. 2017. Malaria Incidence in Zambia, 2013 to 2015: Observations from the Health Management Information System. *Health Press Zambia Bull*. **1**(3):11-21.

19. Jamison DT, Summers LH, Alleyne G, Arrow KJ, Berkley S, Binagwaho A, Bustreo F, Evans D, Feachem RG, Frenk J, 2013. Global health 2035: a world converging within a generation. Lancet 382: 1898–1955. 24.

20. KPMG. 2017*. 2017 Budget Highlights: Zambia*.

21. Lungu, J & Mulenga, C. 2005. *Corporate social responsibility practices in the extractive industries in Zambia*. Ndola: Mission Press.

22. Lusaka Times. 2018. *Government to rollout diaspora policy*. November 6 2018. https://www.lusakatimes.com/2018/11/06/government-to-rollout-diaspora-policy/. Accessed May 3, 2019.

23. Margolis, J.D. and Walsh, J.P. 2001. *People and Profits? The Search for a Link between a Company's Social and Financial Performance*. Psychology Press, Hove

24. Mining for Africa. 2019. https://miningforzambia.com/how-mopani-copper-mines-is-stamping-out-malaria-in-the-copperbelt/

25. Mining Mx. 2019. https://www.miningmx.com/news.

26. Musole K. *Determinants of health care seeking patterns and out-of-pocket expenditure for malaria treatment in Zambia*. A dissertation submitted to the University of Zambia in partial fulfillment of the degree of master of arts in economics.

27. Nonvignon *et al. 2016.* Economic burden of malaria on businesses in Ghana: a case for private sector investment in malaria control. *Malaria Journal* **15**:454.

28. Noyoo N. 2007. *Corporate social responsibility and social policy in Zambia*. Presented at the Conference on Business, Social Policy and Corporate Political Influence in Developing Countries, 12-13 November, 2007: Geneva.

29. Nyambe IA. 2015. *Mapping of CSR in Mining and the Supply Chain*. Submitted to ZACCI, Lusaka, Zambia. July 2015.

30. Oanda. 2019. www.oanda.com

31. Pensulo, E. 2017. Social protection and business in The Ease of Doing Business in Zambia. *The ZAACI Journal* **4**(2): 42.

32. Personal communication. 2019. PACRA employee.

33. Personal communication. 2019. ZACCI employee.

34. Purdy M, Robinson M, Wei K, Rublin D. 2013. The economic case for combating malaria. *Am J Trop Med Hyg*. **89**:819–23.

35. Raykar N & Laxminarayan R. 2014. Benefits and costs of the malaria targets for the Post 2015 Consensus Project. Copenhagen Consensus. Health Malaria Working Paper. Draft 23 December 2014.

36. RBM. 2008. Roll Back Malaria. *The global malaria action plan—for a malaria-free world.* Roll Back Malaria Partnership: Geneva, November 2018.

37. RBM. 2011. Progress & Impact Series. No. 6. *Business Investing in Malaria Control. Economic Returns and a Healthy Workforce for Africa*. WHO: Geneva, May 2011.

38. RBM. 2011. Progress & Impact Series. Country Reports No. 2. *Focus on Zambia*. Geneva, May 2011

39. RBM. 2018. *Private Sector Engagement Framework and Work Plan*. RBM Partnership to End Malaria: RBM/B11/2018/DP10. Geneva, 1 November 2018.

40. Sanyikosa R. 2013. *Study to establish the contribution of the mining sector to GDP in Zambia*. Chamber of Mines of Zambia: Lusaka.

41. Shah MK. 2012. *The informal sector in Zambia. Can it disappear? Should it disappear*? Working Paper, June 2012. IGC: London.

42. Shretta R, Avanceña ALV, Hatefi A. 2016. The Economics of Malaria Control and Elimination: A Systematic Review. *Malaria Journal* **15**:593.

43. Shretta R, Silal SP, Celhay OJ, Mercado CEG, Kyaw SS, Avanceña A.L.V, Zelman B, Fox K, Baral R, White L, Maude R. 2019. An investment case for malaria elimination in the Asia Pacific Region. *Wellcome Open Research Wellcome Open Research* [version 1; peer review: awaiting peer review]. *Wellcome Open Res* 4:60 (https://doi.org/10.12688/wellcomeopenres.14769.1)

44. Stromberg C. et al. 2017. Estimating the Effect and Economic Impact of Absenteeism, Presenteeism, and Work Environment–Related Problems on Reductions in Productivity from a Managerial Perspective. *Value in Health* 20(8): 1058-1064

45. UNdata, 2017. http://data.un.org/Data.aspx?d=SNAAMA&f=grID%3a201%3bcurrID%3aNCU%3bpcFlag%3a0.

46. Visser,W.; Matten, D.; Pohl, M. & Tolhurst, N. 2007. *The A to Z of Corporate Social Responsibility.* Sussex: John Wiley & Sons.

47. World Bank. 2019. www.worldbank.org

48. https://www.worldlifeexpectancy.com/your-life-expectancy-by-age

49. WHO. 2018. World Malaria Report. World Health Organization: Geneva.

50. USAID/PMI. 2019. Malaria Operational Plan FY2019. USAID, Washington, DC.

51. Zambia Chamber of Commerce & Industry (ZACCI). 2019. ZAACI database updated. 2018: Unpublished.

52. Zambia Business Forum. 2010. Zambia Business Survey (ZBS) main summary report, *The profile and productivity of Zambian businesses*. June 2010 http://siteresources.worldbank.org/INTZAMBIA/Resources/The_Profile_and_Productivity_of_Zambian_Businesses.pdf.

53. ZCCM Investment Holdings. 2019. http://www.zccm-ih.com.zm/

54. Zambia Extractive Industries Transparency Initiatives (ZEITI), 2012*: Fifth Reconciliation Report based on the financial year 2012*, ZEITI, pp.54-58

55. Zambia Extractive Industries Transparency Initiatives (ZEITI), 2013: *Sixth Reconciliation Report based on the financial year 2013, ZEITI. 217p.*

56. ZRA. 2019. Zambia Revenue Authority

Annex 1: Companies/persons interviewed

Company	Contact	Email
Dangote Cement Ltd.	Hopkins Mwape	Hopkins.mwape@dangote.com
Eco Bank Zambia		
First Quantum Minerals	Gertrude Musunka	Gertrude.musunka@fqml.com Mulenga.musapa@fqml.com
G Rutherford Outdoor Advertising	Chanel Rutherford	
Handymans Paradise		
Indeni Oil Refinery	Peter Sikanyika	sikanyikapj@gmail.com
Kagem Emerald Mine		
Kansai Plascon Paints	Dilip Shah/Faraaz Mia	faraazmia@gmail.com
Khal Amazi Ltd	Ryan Tunney	
Konkola Copper Mines	Janet Sikasote	janet.sikasote@kcm.co.zm
Lubambe Copper Mines	Rhoda Daka	rhodad@lubambe.com lomthunzim@lubambe.com
Mopani Copper Mines	Mulenga Mbita	
Mwibaranda Public Health Services	Kennedy Ndunda	Kennedy.ndunda@yahoo.com
Neelkanth Lime	Major Katongo	Hr_manager@neelkanthlime.com
PACRA		
Protea Hotels	Nick	velos@unigold.com.zm
Standard Chartered Bank	Saif Malik	saif.malik@sc.com
Trade Kings	Bridget Kambobe	bridget@tradekings.co.zm
Zambeef Products Plc	Crebby Siteta	brendal@zambeef.co.zm crebbysiteta@yahoo.co.uk
Zambezi Portland Cement Ltd	Mr. Voece Mukabile	hrm@zpcltd.net
Zambia Sugar Plc	Mr Collins Mukololo	cmukololo@gmail.com
ZACCI	Mr. Giyani Sakala	policyandadvocacy@zacci.co.zm
Zambia Federation of Employers	Harrington Chibanda	
Zambia Chamber of Mines	Chilembo Sokwani	chilembos@mines.org.zm

Annex 2: Companies engaged in malaria and other CSR activities

Company	# Employees	Type of business	Location	Malaria activities	Other activities	Notes
Chambeshi metals (subsidiary of ENRC)	700 direct (+90 contractors)	Copper cathodes, sulfuric acid, gypsum	Copperbelt	Community IRS	Education Water and sanitization Sports Community development	Evaluates CSR impact
Denison mines					Education Health (rural health post) Water Agriculture Community cooperation	Annual CSR budget 2014: ZMK 653k (93k for health)
Barrick Lumwana mines					Infrastructure, health, education, sports, gender	2014: USD 1.55 million (USD 60k for health)
Non-ferrous Africa mining Plc. (Chambishi mine)	1200				Infrastructure, IRS, education, women's employment	Chinese company Partners: Sandvik, Atlas Copco, Bell, Puma, Spectra, Kobil, Lafarge 2014: ZMK 2.75 million (3.3% health)
ZAMEFA	350 direct (+200 contractors)	Supply chain contractor for KCM, MCM, Chambeshi, Zaffico		IRS and mosquito nets with DHMO	Green initiatives (trees), health and other infrastructure, wellness programs, material support to vulnerable groups	2014: USD 60k (2% health)
CB Energy Corporation (CEC) (Subsidiaries: Liquid Telecom, Realtime Zambia)	390 employees	Green hydropower (50% of all power in Zambia)	North-western Province	IRS in staff compound, ITNs, support Kitwe DHT on IRS	Education, health, sports, youth activities, social infrastructure, HIV, hospitals	Dedicated welfare office. Partner with UK Charity (Beyond CEC)
Atlas Copco		Swedish Marketing Company:			Education, training, HIV/AIDs	CSR activities that are identified by

Company	# Employees	Type of business	Location	Malaria activities	Other activities	Notes
		productive solutions, supply of mining machinery			HIV and AIDS workplace program with funding support from the Swedish workplace HIV and AIDS program and technical support from the Zambia Health Communications Consult Trust (HCCT). The program is being implemented with a participation of six partner companies in mentorship program roll out.	Atlas Copco Employee Committee where employees contribute money that is matched by the company Mulonga Water and Sewerage Company (MWSC), Stanbic Bank Zambia limited, Panorama Security limited, NFCA mining
ASEA Brown Boveri Corporation (ABB) Zambia	12	electrical engineering multinational globally operating company. 80% business from mines			Works with other company for community empowerment and school equipment	ZESCO and Copperbelt Energy Corporation This CSR assistance is given through requests by the community
All Terrain Services (ATS) Zambia	450	Agrobusiness (hq in Ghana)			Catering/food promoting local corporative groupings	Contracted by Barrick no policy on CSR except for CSR training materials that are used internally to equip managers on CSR.
F. S. Musonda Trading Ltd	60	Contracting works from the Mining Industry:	Chingola		CSR is limited to prison assistance and use of premises	

Company	# Employees	Type of business	Location	Malaria activities	Other activities	Notes
		cranes, retail shop			for immunization	
Unity Group	120	supplies clothing outfits to the Zambian mines	Ndola, Copperbelt		Clothes to orphanages, equipment to schools	85% of employees are women
First Quantum Mines	9000 (+ 5000 contractors)		Copperbelt-Kalumbila mines Soluwezi mines Kansanshi mines	Community level malaria agents screen for malaria IRS: employees + community (in partnership with district) Training of spray operators Allowances, pumps, distribution support to PHO TDRC insectary, resistance monitoring, entomology surveys	First aid stations Health care facilities Mobile primary healthcare Awareness and health promotion, roadshows, mass sensitization, screening HIV, syphilis, malaria, BMI, BP, sugar levels Girls empowerment, sexual and reproductive health Strengthening of public health services Conservational farming and livelihood Schools, skill training, community banking, adult literacy	2014: USD 7.5 million in Kansanshi (USD 0.5 million for health)
Kansai Plasticon	91 (25 in Copperbelt)	Paint manufacture (anti-mosquito paint)	Lusaka and Copperbelt	400 houses painted with anti-mosquito paint; Field survey with NMEC and NHRA)	Health insurance for employees Donate paint to schools Awareness programs for HIV	
Konkola Copper Mines	7500 (+ 8300 contractors	Copper and cobalt	Copperbelt-Chiluwombe Chingola	First to introduce IRS in catchment areas, LLINs at	Work with National/PHO/DHO	3 contractors 2 NGOs 2013/4: USD 18.98 million

Company	# Employees	Type of business	Location	Malaria activities	Other activities	Notes
			Nampundwe mine/Lusaka	cost to employees IVM, IPTp, larval source management, distribution of government nets and sensitization, repellents to night shift staff, testing and treatment	2 hospitals and 8 township clinics, free healthcare for employees, communities pay cost (63,200 people) Education, livelihood, sports. Schools, ypouth development, water and sanitation, sports, HIV, ARVs, artificial limbs	(13.9 million to health)
Mopani Copper Mines	9,343 (+ 11,375 contractors		Copperbelt	IRS	Community HIV programs with SAFE, USAID, JSI), 7 township clinics + plant site + underground clinics), schools, community empowerment, sports, sustainable growth	CSR since 2000 2014: USD 23.6 million GBC Health commendation award for integrated HIV program, 5 ZCM awards in 2013
Lumambe Mines	1163 (+10790 contractors		Copperbelt	IRS, LLINs, plans for larval source management around facility	Use KCM clinics	
Zambeef[8]	700-1000 (+500 contractors		Copperbelt: Mpongwe	IRS only at site	1 clinic free for employees, schools, education	
Indeni	350 (+150 contractors)		Copperbelt	LLINs and repellants to all employees, IRS around refinery and adjoining village, larviciding (outsourced),	1 clinic, preschool centers, school equipment, sponsored education, eye screening and cataract surgery	

[8] Zambeef in collaboration with PWC is conducting an investment case for agriculture productivity in Mpongwe

Company	# Employees	Type of business	Location	Malaria activities	Other activities	Notes
				case management in clinics	(with CHAZ and SAFE), HIV/AIDS educators	
Zambia sugar	> 6000 + contractors		Southern	Larviciding, biological control (larvivorous fish), spraying of compound and houses (3000 houses on estate), LLINs (12,000 per year	4 health facilities on estate; HIV prevention, circumcision	
Rotary malaria partners (Zambia)	NA		Masati Mpongwe districsts Mufulira Kalulushi	CHW training, public sensitization	Polio, etc.	
Toyota Motors			Nationwide	Cash/in-kind donation	Education/school books	
Dangote	12000 (240 full-time)		Copperbelt	IRS on plant premises 2x per year	Sensitization on HIV and malaria, deforestation Sustainability week Housing provided Student sponsorship (6 per year for university) Clinic (1 clinical officer and 3 nurses) Have a CSR department	
Neelkanth Lime Cable Metals	2700 (150 contractors per day) 220 140		Copperbelt	Case management in clinics	Clinic Also support local govt. clinics with medicines and RDTs when they run out Fuel, electricity, child health week, painting facilities Clinics are an extension of the DHMT paid by company	

Company	# Employees	Type of business	Location	Malaria activities	Other activities	Notes
					Planning on adding a lab Blanket donations to children's hospital	
Rekays malls			Nationwide		Blankets and mattresses to Ndola teaching hospital	
Zambezi Portland cement	370		Copperbelt	Case management of employees	Medical scheme with Ndola teaching hospital	
Mwibaranda Public Health Services (contractor for mines for IRS-malaria agents supported by mines attached to communities in catchment areas)	120		Northwest and Copperbelt	Support government with training and logistics	Sponsor environmental news on tv Pest control and cleaning hazardous waste	
Standard Chartered (Branded marketing, corporate affairs)	> 700 employees	Bank	Nationwide	Nets for Life	Curable blindness, HIV	

Annex 3: Mining companies reporting CSR activities to ZEITI[9]

No.	Mining Company	Owner	Type of Operation	Location of Main Facilities	Annual Capacity (metric tonnes)
1	Lumwana Mining Company	Barrick, 100%	Ore and Concentrate	Lumwana Mine (Malundwe pit)	20,000,000 ore
2	Kansashi Mining	First Quantum Minerals, 79.4%, ZCCM-IH, 20.6%	Ore and Concentrate	Kansashi Mine, North of Solwezi	12,000,000 sulphide ore 8,400,000 mixed ore 6,100,000 oxide ore
			Metal	Kansashi high-pressure teach and solvent extraction-electrowinning plant	250,000 copper cathode
3	Konkola Copper Mines	Vedanta Resources, 79.4%, and ZCCM-IH, 20.6%	Ore and Concentrate	Chingola Open pit A and Nchanga open pit, Chingola	4,500,000 ore
				Nchanga underground mine, Chingola	2,800,000 ore
				Konkola mine, Chililabombwe	2,400,000 ore
				Fitwaola open pit, Chingola	N/A
				Tailings dams reprocessing, Chingola	N/A
			Metal	Tailings leach plant at Chingola	80,000 copper cathode
				Nchanga copper smelter, Chingola	311,000 copper anode (blister copper), 3,000 copper-cobalt alloy
				Nkana copper refinery, Kitwe	300,000 copper cathode
4	Mopani Copper Mines	Glencore International AG, 73.1%, First Quantum Minirals, 16.9% and ZCCM-IH, 10%	Ore and Concentrate	Nkana mine, including various underground and open pit operations	5,500,000 ore
				Mufulira mine	2,500,000 ore
			Metal	Mufulira in situ leach and solvent extraction-electrowinning plant	17,000 copper cathode
				Mufulira (Isasmelt) smelter	200,000 copper anode
				Mufulira refinery	275,000 copper cathode
				Nkana solvent extraction plant	15,000 copper cathode
				Nkana cobalt plant	2,400 cobalt metal
5	First Quantum Mining and Operations	First Quantum Minerals, 100%	Metal	Bwana Mkubwa solvent extraction-electrowinning plant, near Ndola	52,000 copper cathode

[9] Source: Nyambe, 2015

No.	Mining Company	Owner	Type of Operation	Location of Main Facilities	Annual Capacity (metric tonnes)
6	CNMC Luanshya Copper Mines	NFC Africa Mining, 100%	Ore and Concentrate	Baluba underground mine	1,800,000 ore
7	NFC Africa Mining	China Nonferrous Metal Mining (Group) Company, 85%, and ZCCM-IH, 15%	Ore and Concentrate	Chambishi mine	800,000 ore
8	Chambishi Copper Smelting Company	China Nonferrous Mining (Group) Company, 60%, and Yunnan Copper Industry (Group), 40%	Metal	Chambishi copper smelter	150,000 copper anode (blister copper)
9	Sino-Metals Leach Zambia	China Nonferrous Mining (Group) Company, Sino-Africa Mining Investments, NFC Africa Mining and China Hainan Construction Company	Metal	Chambishi	8,000 copper cathode
10	Chibuluma Mines	Metorex, 85%, and ZCCM-IH, 15%	Ore and Concentrate	Chibuluma South mine, 12 kilometres West of Kitwe	600,000 ore
11	Sable Zinc Kabwe	Metorex, 100%	Metal	Sable copper leach and electrowinning plant in Kabwe	14,000 copper cathode, 600 cobalt carbonate
12	Albidon	Jinchuan Group Resources Holdings	Ore and Concentrate	Munali Nickel mine in Mazabuka, about 60 kilometres South of Lusaka	About 1,200,000 ore
13	Chambishi Metals	Eurasian Natural Resources Corporation, 90%, and ZCCM-IH, 10%	Metal	Chambishi cobalt mine	27,000 copper cathode, 3,400 cobalt metal
14	Lubambe Copper Mine	African Rainbow Minerals, 40%, VALE SA, 40% and ZCCM-IH, 20%	Ore and Concentrate	Lubambe underground mine, North of Chililabombwe	2,500,000 ore
15	Lafarge Cement Zambia		Cement	Main headquarters located in Lusaka along Kafue-Lusaka road, the Ndola plant is situated in Ndeke compound along Chilanga road	830,000 tonnes of cement, concrete and aggregates

16	Ndola Lime Company	ZCCM-IH, 100%	Lime	Located in Copperbelt with the closest township being Ndeke, off Chiwala road	Limestone products
17	Maamba Collieries		Coal	Maamba town in Sinazongwe district of Southern province	Coal
18	San He (Zambia)		Metal		Ferro manganese high carbon
19	Kalumbila Minerals		Ore	North western province, located in Solwezi	300,000 tonnes Copper ore
20	Grizzly Mining		Gemstone	Lufwanyama, situated 50Km south west of the district of Kalulushi Copperbelt	Gemstones
21	Dolomite Aggregates		Aggregates	Copperbelt	Aggregates
22	Universal Mining & Chemical Industries		Metal	Nampundwe Road, Lusaka	200,000 tonnes of steel and Iron
23	Denison Mines Zambia		Exploration	Roma off Zambezi road in Lusaka	
24	BHP Billiton World Exploration		Exploration		
25	Zambian Nonferrous Metals Exploration		Exploration		
26	ZCCM-IH	Share-holding partner in the Mining Companies on behalf of Govt	Metals		
27	Kagem Mining		Emeralds	Kitwe, Copperbelt off Aggrey road in the light industrial area	Emeralds
28	Zambezi Portland Cement		Cement	Ndola lime road in Ndola Copperbelt	Cement
29	Lions Group Quarries		Aggregate	Off Church road, close to Levy junction shopping mall Lusaka	Aggregate
30	Scirocco Enterprises		Cement, Aggregates and Concrete	Located in Makeni Lusaka	