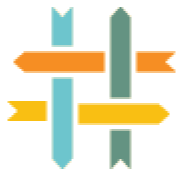

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The Cinderella Province: Examining the Fairy Godmother Role of the State in Providing Accessible Healthcare in the North-Western Province

Amrit Hingorani and Cuong Pham

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I. Abstract

In the past decade, the North-Western Province has entered the spotlight in Zambia as a frontrunner in the mining industry. Despite the growth of the region, developmental indicators remain staggeringly low - a high percentage of the population still lives in rural areas and the majority lives in poverty. One of the most important indicators of development is the provision of and access to healthcare. Thus, our research examines the effects of the introduction of mining into the North-Western Province on access to healthcare in order to identify key issues still facing communities. We synthesized our findings from a comprehensive literature review, qualitative interviews, and data analysis to formulate policy implications. We found that the rise of mining has significantly affected access to healthcare for the province's population. Mining activities form new settlements, which makes providing quality healthcare difficult as well as separates local populations from existing facilities and services. Furthermore, we found that the introduction of mining has caused developments to follow the enclave model - where developments are focused on mining areas instead of the entire population. Finally, since mining was introduced, there has been a lack of resources in key areas in the health sector, namely human resources and drugs, which significantly decreases the capacity of facilities to operate and reduces the provision of care. Despite these shortcomings, the mining industry has potential to contribute significantly to development. The only way to realize this potential is through collaboration and integration of the three main actors: community, company, and government.

II. Introduction

Mining has always played a pivotal role in the history and development of Zambia even before the nation's independence. Today, copper persists as the country's largest export, making Zambia the fourth largest copper producer worldwide (World Bank, 2011). According to the World Bank, mining is a "lucrative sector that has the potential of contributing towards development both at the macro and micro levels" (Cheelo, 2008). It remains unclear, however, whether that growth has been able to reach areas most affected by the mines. One such area is the North-Western Province, where investments in the mining industry have sparked large population influx and developments in areas such as Solwezi. Thus, our research aims to examine the effects of mining on the North-Western Province of Zambia, specifically on the health sector.

There is a wealth of literature on the linkages between mining and economic development as well as the sector's contributions towards poverty reduction efforts. Mining "has the potential to grow the economies of mineral-rich countries to sustainable levels, with potential spill-over and trickle-down effects that impact positively at the micro level through improved economic conditions, social services, and infrastructure development" (Cheelo, 2008). In particular, the opening of two major mines in the North-Western Province, Kansanshi and Lumwana, has brought a great deal of promise to the area. With the legacy of colonial extractive industries and the spirit of a new beginning fresh in people's minds, expectations of development around mining areas were high. However, some of these developments never came to fruition as the local communities failed to reap the benefits of the mining industry and instead have had their livelihoods disrupted by mining activity.

One of the major aspects of the communities' livelihoods that was disrupted is the provision of healthcare. Health, as stipulated by the United Nations under the Universal Declaration on Human Rights, is a basic human right and affects every aspect of life (UN General Assembly, 1948). Thus, for development to be sustainable, there must be proper investment and development of the health sector in a locality.

In this paper, we will examine the health sector in the North-Western Province in the years following the initial mining investments. Our research focuses on whether

expenditure in health has been effective in providing services to the growing population in the province and whether people in the province are able to access existing facilities and services. Through our research, we found that while the number of health facilities and health expenditure have both increased since the rise of mining, the existing facilities often do not operate at their full potential and limit access to quality care. While there are a multitude of reasons for this phenomenon, our findings suggest inequity in resource distribution, formation of new settlements, and lack of resources in key areas as the main drivers of inaccessible healthcare in the region. Thus, government's inability to adequately deliver services that fulfill the expectations of its citizens leaves much to be desired and drives the public to look to other actors, such as mining companies, to fill this void in the provision of basic services.

The structure of our paper is as follows: first, we will provide a review of the relevant literature on mining and development in Zambia and the North-Western Province, followed by an overview of North-Western Province as well as a brief summary of the health sector in Zambia as a whole. Next, we will present our findings on the issues facing people in the North-Western Province pertaining to the health sector and provide possible explanations. Finally, we will provide an analysis of our findings and discuss potential policy implications.

III. Methodology

Our research was conducted using a comprehensive review of relevant existing literature, primary sources, and qualitative interviews. The literature review consisted of relevant scholarly articles, reports from NGOs, civil societies, as well as government reports and statistics.

Relevant data and statistics were collected from the Ministry of Health, Ministry of Finance, as well as other civil society and international organizations such as the World Bank and UNICEF. Upon collection, the data was compiled and analyzed to identify significant trends and patterns over time.

Qualitative interviews were conducted of civil society leaders, academic scholars, and other relevant stakeholders. Due to the sensitive nature of some subject matters, all interviewees were given the option of anonymity.

A synthesis of our qualitative interviews coupled with our quantitative data analysis provides an overview of the situation in the North-Western Province and allowed us to formulate implications for future policy considerations.

IV. Literature Review

History of mining in Zambia

The exploration and extraction of minerals is woven into the Zambian identity. Mineral extraction first began under the British South Africa Company (BSAC) in the late 19th century. BSAC, founded by Cecil Rhodes, "sought to develop the mining industry throughout Southern Africa" (Achberger and Hinfelaar, 2017). In 1911, the protectorates North-Western Rhodesia and North-Eastern Rhodesia were combined into one protectorate (Zambia as we know it today) under the administration of BSAC, where they were able to freely develop mining infrastructure and develop the mining industry in the area. BSAC continued their administrative control over the region until 1924, when control was relinquished fully to the British government. As Achberger and Hinfelaar (2017) argue, the mining industry in Zambia's colonial period only flourished because of two main factors, "the devaluation of the pound sterling against the U.S dollar [… and] the outbreak of the Korean War in 1950, which led to a fresh demand for copper". Even during the its colonial period, the economy of Zambia was highly dependent on the global market price and global demand for copper, with copper production in Zambia fluctuating along with the world price for copper (Figure 1).

After gaining independence on October 24, 1964, copper "represented half of Zambian GDP and almost the entirety (96 percent) of exports for the country" (Achberger and Hinfelaar, 2017). While the slogan of the newly independent nation, "One Zambia, One Nation", called for unity among the people of Zambia, the development of the nation at the time did not reflect the same sentiments. According to Achberger and Hinfelaar (2017),

"[i]nfrastructure, urban growth, education, healthcare and other indices of development were mostly apparent along the so-called line of rail, which included the Copperbelt [...], Lusaka [...], where there were a large number of white settlers and indigenous agricultural enterprises". Despite this uneven development, in 1969, Zambia was classified as a "middle-income country, with one of the highest per capita GDPs in Africa" (Fraser and Larmer, 2010). Fraser and Larmer (2010) contend that the initial hope of development in the maiden years of independent Zambia was to equitably distribute the revenues from copper exports to the entire nation. To this end, in 1969, all the mines in Zambia were nationalized and forced to sell 51% of their shares to the state to stay in operation. The conglomerate owned by the state that would become the acting body operating the mines was named the Zambia Consolidated Copper Mines (ZCCM). Initially, the state used the revenues from the mines to provide services to the people, with ZCCM providing "free education for miners' children, electricity, water, and transport in the townships, operating a 'cradle-to-grave' welfare system" (Fraser and Larmer, 2010). This solidified the perception of the state as the main actor in providing the necessary services to its people, as well as the expectation that revenues from mining would be funneled back to the people and used to provide social protections and services. However, these benefits did not last as long as people hoped.

After the first global oil crisis in 1973, "wages started to fall in real terms [...] and commodity prices tumbled" (Fraser and Larmer, 2010). As established above, the economy of Zambia is highly dependent on global copper prices and as such, when the second oil crisis in 1979 led to a decrease in copper prices, the Zambian economy took a huge hit. In response, "[t]he Zambian state initially borrowed from a range of private Banks and bilateral donors to maintain the progress that had been made in social provisions" (Fraser and Larmer, 2010). But with rising interest rates, the country was thrown into severe debt, which the nation is still dealing with today. ZCCM during the oil crisis was referred to as the Zambian government's "cash cow," with its profits being extracted without new investment in its ventures (Fraser and Larmer, 2010). As a result, no new mines were opened after 1979 and rising production costs coupled with reduced finances available for upgraded machinery and prospecting efforts led to a decrease in ZCCM production by almost 500,000 tonnes from 1973 to 2000. Far from its prosperity during favorable copper markets just

years earlier, Zambia was left as the 25th-poorest country in the world (Fraser and Larmer, 2010).

Under pressure from international organizations such as the World Bank and the International Monetary Fund (IMF) to qualify for debt relief, Zambia passed the Mines and Minerals Act of 1995, dismantling ZCCM and privatizing the mining industry. In the process, individual mining companies negotiated unique Development Agreements (DAs) with the government, which granted these companies lower taxes and favourable business conditions. The economically crippled Zambian government came into these DA negotiations from a position of relatively low bargaining power as a result of the national mines being very costly to operate and severely underperforming in terms of production. The situation was aggravated by the fact that the officials leading the discussion on behalf of the government were later found guilty of corruption and making backdoor deals with the mining companies. Thus, these DAs prevented the government and the general Zambian population from reaping the benefits of the mines, with revenues being concentrated in a small population of executives, politicians, and people in positions of power. The copper boom that followed the privatization, as Achberger and Hinfelaar (2017) argues, only fueled the public's animosity towards the privatization process and the Zambian government.

Since the privatization of the mines, foreign investment in the Zambian mining industry has increased considerably. Production has continued to increases over the first decade of the 21st Century, realizing huge profits for multinational corporations that held majority ownership of Zambian mines. With mining companies deriving large sums of revenue from mineral extraction and public anger compounding following the leakage of the DAs, in 2008, the Zambian government repealed many of the unfavorable DAs and instituted substantial tax reforms in order to increase state revenue gained from mining activities. In recent years, the government has adjusted various aspects of the mining tax system in order to fine-tune its revenue generation capacity and achieve a balance between acquiring a fair share of the benefits and avoiding disincentivizing new investment. Today, the mining taxation system in place is a royalty-tax system similar to ones in other major mining nations such as South Africa and Botswana (Kruger, 2013). Such reforms have paid large dividends for both the national government and mining companies that have invested

in the region. By 2013, after more than $12 billion in investment, Zambia's copper output had more than tripled to 763,000 tons and direct employment reached 90,000 workers nationwide (Muzala, 2016). Through direct effects of mining investment as well as government programs made possible through the greater realization of mining revenue, the Zambian economy has recovered and has experienced sustained growth in the last decade.

From the history of mineral extraction in Zambia, we can see the vital role that copper mining has played in the history of development in Zambia, a role that the sector continues to play today. According to Erin Hern (2015), Zambia remains heavily dependent on copper revenues as agricultural output and tourism have only grown modestly and domestic industry and manufacturing still account for only a small portion of the nation's GDP. As a major national industry, mining has an essential part in Zambia's development. As we saw in the wealth of social provisions provided by ZCCM, copper revenues, if utilized well, can be a legitimate tool for the development of a nation. In the next section, we explore the linkages between mining and such development.

Mining and development

According to Cheelo (2008), large-scale mining has the potential to stimulate economic growth at both the macro and micro level. At a macro level, mining can invigorate the national economy and increase government revenue, facilitating government programs to reduce poverty. At a micro level, mining can promote growth by creating employment opportunities, improve local capabilities through increased entrepreneurship, as well as attract infrastructure development both publicly and privately. In theory, communities around the mines should be benefiting immensely from the introduction of mining, however this has not been the case both internationally and in Zambia.

The extractive industry has had a poor track record in promoting sustainable growth internationally. In a study on the linkages between the growth of the mining industry and the conceptions of poverty, Pegg (2006) found that the mining industry often has negative impacts on poverty reduction efforts, contrary to popular and theoretical beliefs. Empirically, mineral dependence has had a negative effect on economic growth as

well as increased inequality within the countries studied. Furthermore, the growth of mining introduced new vulnerabilities to local communities. The rapid influx of people in mining areas inflates prices of goods in the area and decreases the purchasing power of locals, while also introducing new public health risks, such as HIV and other communicable diseases. Thus, at the international level, mining has not been the tool for development that it was touted to be. Even though the sector was supposed to foster development, in reality, local communities have actually suffered from the introduction of mining.

The same patterns are evident in the situation in Zambia. In a case study of Solwezi town, Cheelo (2008) found that the opening of the Kansanshi mine has had a mixed impact on the local communities around the mines. Despite the mine bringing about many economic opportunities, the majority of the population of Solwezi town was not able to reap the benefits due to illiteracy, lack of infrastructure, or lack of resources. Thus, most of the opportunities only opened up for the urban elites. Kesselring (2017) states that the arrival of mines in an area invariably result in "stark differentiation in living conditions, access to services, and chance for employment... spatially and socially segregating persons along their place in the production process." Moreover, for many in local communities, the opening of the mine was detrimental to their livelihoods. According to Cheelo (2008), numerous communities were displaced and forced to resettle "after losing both their fields and settlements to the Kansanshi mine". As a result, community members were taken away from their productive systems and income generating activities. According to the study, 44% of participants had their land holdings "reduced to none" after the Kansanshi mine opened. Furthermore, 73% of participants lost their land to mining activities, of which 80% were not compensated for their lost livelihoods (Cheelo, 2008). Excerpts from qualitative interviews conducted by Cheelo show the difficulties community members face when forced to separate from their livelihoods:

> It is better either the government or the investors prepare the new areas where people will be relocated to before they are moved. You know it is difficult when you have established yourself only to be moved to a new place where you have to start from scratch. It takes time for one to come back into full swing (State Ranch focus group interviews)(Cheelo, 2008).

Furthermore, the extractive industry has not only exposed the local community to new vulnerabilities and risks but has also brought about unequal development. Mining investment in the North-Western Province has often been described in literature as "a classical enclave economy" (Bebbington et al., 2008). An economic enclave is defined as a physically, administratively, or legally bounded territory characterized by the following: (1) dependence on one or a few large firms - in this case First Quantum Minerals Ltd. and Barrick Gold Corp., which own the Kansanshi, Kalumbila, and Lumwana mines; (2) high specialization in one activity - copper mining in the case of the North-Western Province; and (3) weak integration into the local economy, which is used primarily to access some local factors of production, such as labor (Phelps et al., 2015). The enclave model is a legacy of Zambia's colonial history, when rural areas in Zambia (or Northern Rhodesia at the time) were used mainly as labor reserves for the lucrative mines, while urban areas reaped the majority of the benefits. This pattern of development continues to persists in the province. Today, mines and mining compounds are physically fenced off and isolated from the communities that surround them. Developments erected by the mines, meant to aid local communities, are designed to primarily benefit mining operations. A clear example of this is the planning and construction of a new access road by the mine to decrease the time between production steps and expedite the transportation of materials. The road allows truckers to bring copper concentrate to smelters in Kansanshi quicker by circumnavigating the bustling roads of Solwezi town (Kesselring, 2018). This access road is a part of the efforts by the mines to disassociate and separate themselves from their locality. However, despite these efforts, it is impossible for mining companies to completely and fully isolate themselves from their surrounding communities.

As Kesselring (2018) argues, in the process of isolating themselves, mining companies remain inextricably linked to the local community, "re-structur[ing] people's lives in multiple ways and integrat[ing] even more people into the mine's circle of gravity". The existence of mining in an area stipulates a "very significant broader social project" (Ferguson, 2008). For example, in the Zambian Copperbelt, the introduction of mining in the 1920s also brought about the establishment of "company towns" for thousands of mineworkers. These company towns soon had schools, hospitals, and even recreational facilities like movie theaters (Ferguson, 2008). As recently as 2015, a new district,

Kalumbila, was erected in the North-Western Province, transforming the area from a small-scale farming town to the booming hub at the heart of the extractive industry in the province. The introduction of mining into an area also attracts new infrastructure development that has wider social impacts on the surrounding community. The access road in Solwezi, for instance, used up much of the farmland in the area, displacing many farmers and forcing them to resettle.

The mining industry also affects nearby localities through Corporate Social Responsibility (CSR) efforts. While there is no universally accepted definition for CSR, some pieces of literature do provide a working definition which will be employed in our paper. Littlewood (2013) defines CSR as “an overarching term to describe the policies, practices, and engagements by mining companies [...] with social, environment, and development issues going beyond legal compliance”. As we’ve examined in our overview of the history of mining in Zambia, copper revenues were used to provide social services and protections during the days of ZCCM, leading to an expectation by the people that revenues should be funneled back into the community and provide the same level of services. After privatization in the 1990s, the same expectations still persist even though the mines have exchanged hands. People in the mining communities now look towards the mines to satisfy their developmental needs. While in recent years, the mining industry has taken on more CSR initiatives, the efficacy and implementation of these initiatives have been questionable. Most salient among these criticisms is the view that CSR initiatives often only focus on micro-level developments and smaller initiatives, while eschewing wider social and environmental issues (Littlewood, 2013).

While the mining industry often operates as an enclave in terms of development, it still has significant social impacts on adjacent areas. The aim of our research is to assess whether such impacts have been positive or negative in the context of the North-Western Province. Before honing in on the health sector in the province, we first look at the healthcare system in Zambia as a whole.

Overview of Healthcare System in Zambia

> Equity of access to assured quality, cost-effective and affordable health services as close to the family as possible in order to ensure equity of access in health service delivery and

contribute to the human and socio-economic development of the nation" -Overall goal of the Zambian health sector (Ministry of Health et al., 2015)

In Zambia, healthcare services are provided by both private institutions such as church missions and industrial companies as well as public facilities run under government supervision. The public healthcare system of Zambia consists of three levels of health facilities under the purview of the Ministry of Health and the Ministry of Community Development, Mother and Child Health. Third level hospitals are known as central or specialist hospitals and are the highest referral hospitals in the country. These facilities are meant for about 800,000 people and include a wide range of sub-specializations from internal medicine to psychiatry. Second level hospitals are known as provincial or general hospitals and serve a population of about 200,000 to 800,000. These are referral centers for level one hospitals and include a subset of specializations found in the third level facilities. First level health facilities provide community-level health services and include district hospitals, health centers, and health posts. District hospitals are known as first level referral hospitals and cater to 80,000 to 200,000 people. They provide the full complement of clinical services in addition to limited surgical capacities. At a lower level, health centers are split into urban (30,000 to 50,000 people) and rural centers (10,000 people) which are differentiated by the population size they serve. Finally, health posts provide the most basic levels of healthcare and are typically built in communities far away from health centers. Health posts provide service for those living in a 5km radius or approximately 3,500 to 7,000 people and offer basic first aid rather than curative options (Ministry of Health, 2011).

The financing of Zambia's health sector is complex and extremely fragmented as various expenditures, such as salaries and drugs, are dispersed by different agencies (Ministry of Health, et al., 2015). In 2010, public expenditure on healthcare was only 3.4% of the nation's GDP, one of the lowest levels in southern Africa. In 2013, this had risen to about 5.0%, slightly higher than the WHO's low and middle income country average at 4.2%, indicating slight improvement over this period of time. Financing for the health sector primarily stems from the government through general tax and budget support with external donors making up the remaining 34% of total resources for health (Health Policy

Project, 2016). The budget allocation formula for governmental district healthcare grants takes into account four variables: population weighted for price of fuel, population weighted for epidemics, population weighted against population density, and presence of a bank. Yet, this equity-enhancing feature only affects a small portion of the total healthcare budget, while funding for second and third level hospitals continues to be based on the facilities' number of beds (historical budgeting). This continuation of historical budgeting in hospital allocation has made it difficult for Zambia to reduce provincial inequities in the healthcare sector and has exacerbated underlying socio-economic inequalities between provinces. In the mid-2000s these policies resulted in the most urbanized and richest provinces in Zambia having per capita government health expenditures three times as large as the most rural and poorest provinces (Ministry of Health et al., 2015). This inequality is then intensified within provinces, where rural health centers are generally the least provided for, while urban health centers and hospitals receive the lion's share of resources despite the lower number of facilities of these types.

The Zambian health sector faces numerous challenges. Across the health facilities in general, there is poor hygiene, a low rate of power connection, high levels of inadequate or dysfunctional equipment, and long waiting times. The nation has also been experiencing long-term drug shortages. Essential and life-saving drugs are widely unavailable, prolonged drug stock-outs are commonplace, many facilities possess expired or inappropriate drugs, and various vaccines are unavailable in wide swaths of the nation. The Ministry of Health has also chronically suffered from a human resource shortage with levels of trained health professionals nationwide falling short of generally accepted levels. This shortage of trained health workers coupled with high rates of staff vacancy and absenteeism have led to extended working hours for many health professionals and less time spent on direct patient care. Furthermore, an increasing proportion of public health resources have been going to administration rather than necessary service provision and facilities at all levels are much more labor intensive than their mission and for-profit counterparts. The large amount of resources spent on personal emoluments in recent years is not sustainable and limits the provision of quality healthcare to the nation's citizens (Ministry of Health et al., 2015).

Why North-Western Province?

Our research focuses on the North-Western Province as its rising position at the forefront of Zambia's mining industry poises it to be the crowning jewel of Zambia's provinces. Throwing off the legacy of political and economic historical neglect, the North-Western Province has stolen the spotlight over the last decade with its newly revamped mining industry. Mining contributes heavily to the nation's GDP and as of December 2017, the North-Western Province accounted for 44.1% of the country's mining industry, second only to the Copperbelt (Pressreader, 2017). This contribution of the North-Western Province's burgeoning mining sector made it 4th highest of the ten provinces in terms of contribution to the nation's GDP (Lusaka Times, 2017). The booming mining industry of the North-Western Province, coupled with the relative decline of its counterpart sector in the Copperbelt, has made it the ideal destination for job-seeking laborers as well as capital investments, further contributing to the region's prominent growth. With rapid and large expansions in population and capital in the province, planned developments according to government policies have been difficult, affecting the provision of social services such as healthcare. Health is a basic human right and its accessibility remains a major, largely unexplored issue in the North-Western Province. Thus, we chose to devote our efforts to examining the effects of mining on a number of key issues in the North-Western Province, with a particular focus on the healthcare sector and its accessibility.

Overview of the North-Western Province

The North-Western Province is the most sparsely populated of Zambia's ten provinces with a population density of only 5.8 per square kilometer as of 2010. In 2015, the North-Western Province accounted for only 5.35% of the total Zambian population.

The North-Western Province has often been referred to as the "Cinderella Province", stemming from the perception that the province has historically been overlooked at the national level (Pritchett, 2001). As an epicenter of opposition throughout Zambia's political history and a predominantly small-scale rural province, the North-Western Province has been both politically and economically marginalized since colonial times. Kesselring (2017) describes the North-Western Province as the "notoriously neglected region of every post-

independence government". For instance, under the First National Development Plan, the North-Western Province has the lowest planned health expenditure per capita of any province and even then still received 31% less healthcare funding than promised (Hern, 2015). This legacy of neglect continues to impact the province today evidenced by the fact that its capital, Solwezi, is not connected to the national railway network and much of the province is not integrated into the national power grid (Kesselring, 2018).

Extractive industries which play major roles in the province's modern economy have their roots in colonial times. The mining town of Solwezi was created in 1901 as a center of colonial governance "to administer, service, and support the mining function" and has developed over the last century into the bustling provincial capital evident today (Hern, 2015). The open-pit mines that dominate North-Western's economy today are legacies of the opening of the first industrial copper mine in Zambia near Solwezi in 1908. Yet throughout most of the 1900s, mining in Zambia was largely focused on the Copperbelt and mining activities in the North-Western Province were for the most part closed or running on very low capacity (Kesselring, 2018). Much of the development of the province and of Solwezi in particular has taken place in the last decade and a half as three large-scale mines have been opened since 2003. Lumwana was opened in 2004, with Kansanshi following close behind in 2005. The Sentinel mine in Kalumbila began operating more recently in 2015. The opening of these mines coupled with relatively recent discoveries of oil and gas reserves has stolen the spotlight from the Copperbelt, which has traditionally been at the heart of mining activities in Zambia. These developments have driven increased investment in the area and its rapid growth economically and politically, resulting in the province being dubbed "The New Copperbelt" (Alstine, 2013). Looking at the map of mining licenses throughout Zambia, we can see the increasing prominence of the North-Western Province in the mining industry (Figure 2). Today, Kansanshi mine is the biggest copper mine Africa by output and mining in the North-Western province contributes a substantial portion to Zambia's national revenue (Kesselring, 2018).

Despite the meteoric rise of the North-Western Province's mining industry bringing immense profits to the multinational corporations that own the mines, the benefits of the development of mining towns have not been fully realized by the province's local population. Poverty rates in the province have historically been high and as of 2015, the

poverty rate was 66.4% and the incidence of extreme poverty was 48.4%, both of which exceeded their respective national levels (Central Statistical Office, 2015). Poverty from 2010 to 2015 in the province did not change significantly while extreme poverty increased slightly. While the province's Gini coefficient decreased over these five years from 0.62 to 0.48, it still remains high, indicating the persistence of high levels of inequality in the province (Central Statistical Office, 2010, 2015).

While the mining sector in the province has expanded rapidly in recent years, throughout its history, the North-Western Province has been dominated by agriculture, in particular the production of sorghum (Central Statistical Office, 2014b). The province remains predominantly rural with 72.8% of the province's population living in rural areas in 2015 (Central Statistical Office, 2015). Mining investment has led to a rise in urbanization in the province since the mid-2000s, yet consistent with the enclave model of development, this urbanization has been relatively limited to areas surrounding the mines, leaving much of the province settled in its agricultural livelihood. Even so, between 2006 and 2015, the proportion of the provincial population living in urban areas rose from 15% to 27.2% and mining towns, such as Solwezi, have experienced skyrocketing population growth. Over this nine year period, the North-Western province's urbanization rate was more than double than the national rate, exemplifying its rapid urbanization over such a short time scale (Central Statistical Office, 2012, 2015). As a by-product of its agricultural focus, the province has a high proportion of workers in the informal sector. In 2015, 88.3% of the province's workers were involved in informal employment, in a large part due to the high prevalence of small-scale farmers and agricultural laborers (Central Statistical Office, 2015).

Focusing on the health sector in the province specifically, the number of health facilities has been increasing in recent years with a total of 163 health facilities in 2012 rising to 248 in 2017. The increase in health facilities over this period can largely be accounted for by the rise in the number of rural health centers and health posts, the two most basic types of healthcare facilities. The vast majority (87%) of the facilities in the province are government-owned although there has been a marked rise in private health facilities with their number quadrupling over the same time frame. As of 2017, the

province contains no third level hospitals, two second-level hospitals, and eleven first-level hospitals (Ministry of Health, 2012, 2017).

Examining common health indicators for the North-Western Province yields mixed results. Immunization coverage in the province has been steadily increasing, shifting from twenty percent below the national coverage rate in 2008 to exceeding the national average by ten percent in 2012. Length of stay for health facilities in the North-Western Province has also decreased significantly from seven days in 2008 to 2.1 days in 2012, displaying a marked improvement. The incidence of malaria, diarrhea, and respiratory infection has steadily increased between 2008 and 2012, with the levels of the diarrheal and respiratory conditions higher than any other province in 2012 (Ministry of Health, 2010, 2012). According to the 2015 Living Conditions Monitoring Survey, the North-Western Province had the highest proportion of deaths due to malaria in the nation at 27.2% (Central Statistical Office, 2015). Within the context of the North-Western Province framed in this section, we move on to assessing the issues still facing the health sector of mining communities in the North-Western Province.

V. Findings

Formation of new settlements

Rising mining investment in the province increases the migration of people from the Copperbelt and other regions seeking employment in the mines as well as other enterprises in the new mining towns. As a result, the population of Solwezi has grown almost fivefold in the past decade as more and more people flock to the region looking for opportunities. The large influx of people into the area puts a huge strain on existing facilities and services, which were designed for a smaller population. As one of our interviewees states:

> The level at which the population is growing with the facilities merging together - so the facilities can't meet the demand (Interview with a community leader in North-Western Province)

The fast-paced nature of the population growth without a corresponding increase in infrastructure development also leads to the sprouting of informal settlements. Migrants often seek accommodation in informal settlements either due to housing shortages in the town or high costs of minehouses. In Solwezi, for example, there are about 12 unplanned settlements distributed around town (Musonda, 2012). However, these informal settlements lack essential services such as access roads, piped water, and electricity "because they do not fall within the mandate of the Council to service them" (Musonda, 2012). Because these settlements tend to appear without notice or planning, government developments often lag behind. This is in contrast to the planned development in the Copperbelt which evolved under rigid colonial control whereby mines owned the surrounding land and provided housing and services for the community. The main difference with Solwezi lies in government structure in that the town was previously an administrative town wherein land was owned by traditional leaders. As a result, once Solwezi developed into a booming mining town, there was less capacity to plan for such rapid development, leading to the emergence of informal settlements. Still today, investments in infrastructure and social provisions in mining areas of the North-Western Province do not occur until years after the settlement has formed. As one interviewee states:

> For example, in Kalumbila, a mine starts, and government has no idea, which means that facilities like healthcare or police and even education facilities only start coming after 4-5 years. But you're not going to see results immediately after you start investing. Only after 5-10 years will you see the benefits. As the mines open, many people flock to the area, which puts a strain on the infrastructures and other facilities (Interview with University of Zambia (UNZA) health economics professor)

Additionally, the introduction of mines into already established communities displaces the local population and forces them to resettle into new communities. One consequence of resettlement, as discussed in a previous section, is the separation of local community members from their income generating activities and livelihoods, thus exposing them to increased vulnerabilities. Moreover, resettling local communities from their original location also separates them from the existing services and facilities they previously had

access to. While some communities are relocated to an adjacent area, other communities, such as New Israel, are relocated 40 km away (Figure 3), significant decreasing their access to services. For instance, in New Israel, Van Alstine et al. (2013) found that many community members still have to walk up to five hours to reach the nearest health clinic. Furthermore, Musonda (2012) also found that the formation of informal settlements disproportionately affects lower income households, as they are more likely to adopt informal housing development as an alternative to formal settlements. Interviews conducted by Van Alstine et al. (2013) of New Israel community members shows how resettlement profoundly impacts many households:

> When we first came here and when we fell sick we walk for eight km to the main road; if we found a car on the road it would charge us ZMK10,000 (US$2). If we didn't find a car we would walk to Solwezi Town. I have walked five times to Solwezi Town. (New Israel community member) (Van Alstine et al., 2013)

> We used to live near a school and clinic. Even the hospital in Solwezi Town was close. This place is far from anything. Even the school we have we have struggled to construct as a community, except for the iron sheets provided by the mine. (New Israel community member) (Van Alstine et al., 2013).

Thus, the development of mining the North-Western Province is often accompanied by the formation of new settlements that makes it difficult for communities to access healthcare. The difficulties faced by these communities are exacerbated by the inequities that still persists in the region.

Inequity in the distribution of resources

Consistent with the enclave model of development discussed above, since the introduction of the mining industry, there has been a trend of inequity in the distribution of resources, often favoring urban areas and areas around the mines as opposed to the wider population. This inequity prevents the large majority of the population living in rural areas

in the North-Western Province from accessing healthcare infrastructure and services.

Overall, the North-Western Province is a relatively unequal province. Despite remaining above the national average, the North-Western Province poverty rate decreased significantly from 1993 to 2004. From 2004 to 2015, overall poverty rate has slowly but steadily decreased over the years to 66.4% in 2015. The incidence of extreme poverty fell sharply from 61% to 44.6% from 2004 to 2006 yet has been continuously increasing, albeit very slowly, over the following nine years to reach 48.4% in 2015 (Central Statistical Office, 2015, 2012, 2005). One possible explanation for the rapid drops in both overall poverty and extreme poverty between 2004 and 2006 is the large influx of moderately-poor and middle-income workers, diluting the poor population of the North-Western Province. This would be the case even more so for the extremely poor as many of the workers attracted to the new mining centers are skilled in terms of specialized mining activities and fall into the low to middle socio-economic classes.

According to the Living Conditions Monitoring Survey in 2015 published by the Central Statistical Office, 18.9% of households in rural areas live less than 1 km away from the nearest health facility, whereas 67.9% of households in urban areas do. However, 31.4% of households in rural areas live 6-15 km away from a health facility, compared to only 2.2% of urban households within the same distance. Furthermore, over 160,000 households in rural areas live more than 16 km away from a health facility, compared to only about 2,200 urban households that live as far away (Central Statistical Office, 2015). Overall, rural households are disproportionately further away from a health facility compared to urban households (Figure 4). Coupled with the fact that rural areas tend to lack the proper infrastructure and services such as roads or public transportation, rural households have extremely limited access to facilities. As Cheelo found in his qualitative study of the Kansanshi mine in Solwezi:

> The State Ranch residents who were resettled from the current mining area have to cover a minimum of three hours cycling to the nearest clinic at Katandano Zambia National Service (ZNS) camp. In the absence of a bicycle, patients are not able to reach home the same day after seeing the clinician, let alone if they need to buy prescribed medicine from a chemist in town. (Cheelo, 2008).

Using data on the North-Western Province found in the Annual Statistical Bulletins from 2005 to 2008 published by the Ministry of Health, we also found that health centers, which are primarily concentrated in rural areas, had a lower percentage of months with adequate drug stocks compared to other hospitals, which are usually located in more urbanized regions (Figure 5). While this is symptomatic of the health sector in Zambia as a whole, this trend suggests that rural households are disproportionately affected by this shortfall in key resources. On top of the limited access to facilities for rural populations due to sheer distance, this shortage further limits the care available, sometimes depriving this populace of any care at all. In one of our interviews, a professor in health economics at UNZA stated:

> If you look at the health expenditure per capita, you may find that there are some inequities in the distribution of resources across not only regions, but also across different layers within the health sector. You may find that few hospitals in the NWP are taking huge chunks of the government expenditure and a number of rural health facilities have very little, and that's where we should actually be paying attention to (Interview with UNZA health economics professor).

This inequity between different areas within the province further harms the already vulnerable rural population. This inequity is then aggravated by the lack of resources in important areas of service provision, further impinging on the ability of the population to obtain adequate care.

Lack of adequate resources in key areas

While conventional measures of healthcare in the North-Western Province such as health expenditure and the number of facilities have been increasing since the introduction of mining, the ability of these resources to be used at their full potential is limited by other factors such as shortage of drugs and highly trained health professionals. The health sector in the North-Western Province possesses the physical health infrastructure such as a high number of health facilities, beds, and cots for patients, yet it is deficient in areas of human

resources and medical supplies, suggesting the need for a re-evaluation of funding within the health sector to better provide proper healthcare services to the province's population.

In terms of the physical infrastructure within the health sector, the number of health facilities per capita has been much higher in the North-Western Province than the Zambian average between 2008 and 2017, exceeding the national average by a factor of between 1.5 to 1.85 over the nine-year span (Figure 6). Furthermore, in the North-Western Province, the number of health facilities as well as the number of health facilities per capita have both been increasing over the same time frame (Figure 7). Consistent with these findings regarding physical health infrastructure, the per capita amount of beds and cots in the province has been consistently higher than the national average when looking at data over the period 2008 to 2012 (Figures 8 and 9).

While certain measures of physical infrastructure within the health sector in the North-Western Province are above their respective national averages, overall health expenditure per capita in the province has regularly been below the national level. Despite this, per capita health expenditure in the province has grown at a faster rate than the national average has, lessening the disparity between the two over the time frame examined. In 2006, per capita health expenditure in the North-Western Province was only 35% of the national average while in 2016, provincial per capita expenditure was up to 83% of the national level (Figure 10). While this displays significant improvement over the years, a substantial gap in per capita expenditure still exists between the North-Western Province and the national average, making it harder for health facilities in the province to maintain acceptable levels of resources and provide adequate healthcare services.

One key healthcare resource that is extremely lacking in the North-Western Province is the amount of drugs available at health facilities. While Zambia as a whole has historically experienced widespread drug shortages, the picture in the North-Western Province is much more bleak. From 2003 to 2008, an increasing number of health facilities in the North-Western Province have been out-of-stock of drugs, consistently falling short of the already poor national average by an additional ten to twenty percent (Figure 11). For instance, in 2008, health facilities in the North-Western Province reported only having adequate stocks of drugs 48% of the time, 21% below the national average. All our interviewees confirmed the persistence of this phenomenon to the present-day with a

community leader from the North-Western Province commenting:

> In terms of essential drugs, it is also a problem. Like Panadol, malaria drug, and other essential, essential drugs...Cause in the clinics there is no medication – essential drugs are not there... All hospitals in the North-Western Province are not well stocked with drugs.
> (Interview with a community leader from the North-Western Province).

Considering the importance of drugs in medical care in Zambia both for treatment and prevention of a multitude of diseases and illnesses, this extreme shortage of essential drugs is quite alarming.

In addition to a general shortage of drugs, Zambia also has low levels of highly trained healthcare professionals. For the purposes of this paper, we define highly trained healthcare professionals as those who have received university training before becoming licensed. This includes clinical officers and medical doctors. These health workers are differentiated from less trained health workers such as nurses (2-4 years of basic training) and community health workers (limited basic or formal training) (Ferrinho, 2011). Overall, the number of health workers per capita of each of the six major types has been steadily increasing in the province between 2008 and 2012 (Figure 12). Despite this increase, there still exists a scarcity of highly trained personnel. Similar to the drug shortage, while this phenomenon is not specific to the North-Western Province alone, this situation in the province is more severe. The lack of highly trained medical professionals, such as doctors, even with a greater number of lower skilled workers, such as nurses, leads to higher workloads for individual healthcare workers and a decrease in the number services offered or reduction of quality of care. Looking at the number of doctors and nurses per 10,000 population in the province compared to the national averages, the number of nurses per capita has been consistently higher than the national level and steadily increasing since 2008 while the number of doctors has always been much lower than the national level and fluctuates a bit (Figures 13 and 14). However, the relatively high level of low-to-mid trained health workers, such as nurses, does not compensate for the shortage of highly trained health workers such as doctors:

> And looking at the nurses and the doctors – inadequacy in terms of the manpower or labor or the qualified doctors and nurses. We require more. I think we need more health personnel because what we have is not adequate (Interview with community leader in North-Western Province).

The shortfall of healthcare providers in the North-Western Province is yet again highlighted in the 2008 Annual Statistical Bulletin as of the six types of health workers examined, the North-Western Province had lower levels of five types, only having a reduced shortfall in the number of nurses (Ministry of Health, 2009). This ties in with data from the 2012 Annual Health Statistical Bulletin regarding the number of consults by type of medical care provider. When compared to Zambia as a whole, fewer people in the North-Western Province were able to consult with highly trained medical professionals such as doctors and clinical officers while a higher percentage of people were able to consult with nurses due to their higher numbers (Ministry of Health, 2014). This is further supported by data collected by Ferrinho et al. (2011), who found "high ratios of enrolled nurses to general medical officers" in the province. He additionally concluded that "there is a shortage of highly skilled health workers in the North-Western province" and "most workers have low to mid-level training, which skews the statistics in terms of health workers per capita" (Ferrinho et al., 2011). In the same vein, Van Alstine et al.'s study in 2013 found that in Kyafukuma, a compound in Solwezi, "the only health facility in the community is understaffed. Its two nurses serve the entire community and other nearby hamlets" (Van Alstine et al., 2013).

Along with the high number of nurses in the province, the number of trained traditional birth attendant and community health workers per capita in the North-Western Province have been significantly above the national average of these healthcare workers over the period 2006 to 2008 (Ministry of Health, 2009). These community-focused health workers generally receive less training than formal doctors and provide only the most basic medical care. Their relative abundance in the province further reinforces the narrative that the province has unsuccessfully attempted to fill the gap of highly trained medical professionals with a greater number of lower skilled workers.

This overall shortage of trained human resources in the healthcare sector in the North-Western Province has had an effect on the quality of healthcare administered. Looking at health center staff daily contacts, workers in the North-Western Province see an average of 10-15% more patients daily when compared to the Zambian average. This significantly reduces the time spent with each patient, which may negatively affect provision of healthcare (Ministry of Health, 2008). Furthermore, the lack of trained health professionals may lead to patients being seen by less qualified healthcare providers who may not be able to provide the same level of care. When asked about the human resource situation in the North-Western Province's health sector, one of our interviewees stated:

> It is not adequate. The statistics, the doctors, the big hospital which is supposed to have maybe about 10 doctors, it only has about 3 or 4. That on its own tells you it is not adequate. The people who are doing most of the work are these people, the trainees. You'll find that the trainees will question that impact or that problem (Interview with community leader in North-Western Province).

These deficiencies in the human resource component of the North-Western Province's health sector are further compounded by high vacancy rates and rampant absenteeism among health facility workers which further restricts access to healthcare (Ministry of Health et al., 2015).

Shortages of health resources in key areas represent a significant barrier to the access of adequate healthcare for the people of the North-Western Province. While there is no direct causal link between the introduction of the mining sector in the province and the exacerbation of these resource shortages, the interplay between the people's expectation of the state to provide social services, the state's reliance on the mines to be responsible for their surrounding communities, and the mines limited and piecemeal CSR investments indirectly has contributed to the intensified health-related shortfalls in the province following the boom in mining investment in the mid-2000s. The failure of both the government and the mining companies to step in and fill the gap in healthcare services leaves the citizens of the province as the ultimate losers and the ones that have to suffer from the shortages in resources such as health personnel and drugs. Physical

infrastructure, such as high numbers of health facilities and beds, gives the illusion that the institutions responsible for the healthcare system are fulfilling their responsibility, yet a look beneath this superficial veil of competence at health service provision yields disheartening results. This suggests a need for re-examination of the healthcare sector in the North-Western Province and the relationship between mining and development in the region. To this end, we formulated policy implications that would address the issues discussed in this section.

VI. Policy implications

Health sector reform

Our findings indicate an a number of issues in the healthcare sector in the North-Western Province as well as Zambia as a whole, rendering the system unsustainable in the long-run. The Zambian government has undertaken numerous efforts in recent years to reform the health sector in order to better fulfill its objectives. While such efforts have produced limited improvements in certain health indicators, they have failed to address the underlying problems that plague the healthcare sector on the national level. Our research has led us to two possible health reforms, namely the decentralization of the health sector and an overhaul of the distribution of healthcare expenditure both on a national and provincial level.

Zambia was one of the first countries in Africa to implement a wide-ranging process of decentralization in its health system (Bossert, 2004). In fact, the Zambian government has continued to flirt with decentralization throughout its history, most notably in the late 1990s and the period from 2008 to 2013, yet all of its efforts have fallen short of producing the complete set of intended benefits. Previous decentralization efforts in Zambia have combined deconcentration of power to district health officials as well as delegation of authority from the Ministry of Health to an autonomous Central Board of Health. Health expenditures and internal allocations of resources were based at the local and district levels. The Central Board of Health set percentage ceilings and floors on how much of the

total budget districts could spend on certain expense categories and provided grants, which made up the largest source of revenue for the districts (Bossert, 2004).

Despite the Zambian efforts being based on successful decentralization models in other countries such as Chile and Colombia, many of these decentralization efforts have not produced as many benefits as previously hoped, with some of the major components having been reversed. Furthermore, research on the health sector under these decentralization efforts yielded mixed results, with some health indicators improving while others worsened during the period of decentralization. However, this is likely due to the implementation of administrative decentralization without proper fiscal and political decentralization to accompany it. Local and district administrative levels were granted new functions and responsibilities yet were not provided with a sufficient financial resources to match these heightened expectations. The insignificant transfer of fiscal resources to the district and local authorities left significant gaps in service delivery capacity and limited the developmental potential of communities (Bossert, 2004). As Cheelo (2008) states, "without adequate financial sources, local authorities cannot effectively provide services to their communities, and their capacity for service delivery and socio-economic development, as well as autonomy is undermined". Thus, the district and local levels responsible for social service provision were unable to fulfill expectations due to lack of resources and failed to provide meaningful services to their populations.

An additional drawback of previous decentralization efforts that must be addressed is the lack of capacity in local governments to handle the increased functions and responsibilities placed on them after decentralization. Cheelo (2008) points to the "lack of integrated district development management and planning," "the absence of an effective coordinating mechanism under the direct control of the local authority at the district level," "weak linkages between the district administration, local authorities, and communities," as well as the "lack of meaningful citizen participation" as major setbacks to the implementation of decentralization policies. One major shortfall of the most recent widespread decentralization efforts in 2009 was that "government administrative units in the districts remained poorly accountable and responsive to the needs of the local populations", negating the most beneficial aspect of decentralization insofar as it allows the local governments to fine-tune allocation of resources to specifically address the most

pressing needs of its citizens (Cheelo, 2008). Thus, moving forward, in order for decentralization efforts to produce any meaningful benefits, the authority of local governmental institutions must be strengthened and the participation of citizens must be solidified prior to policies focusing on decentralization. This political decentralization is a crucial aspect without which administrative or fiscal decentralization cannot function. Even with increased responsibilities as well as with higher levels of financial resources, without adequate authority to properly take advantage of these improvements, local governments will be unable to effectively address the needs of its citizenry and realize the full potential that decentralization offers. This must especially be considered in areas where the starting point of bureaucratic infrastructure is low due to the underdevelopment of civil service capacity to run institutions. In these cases, increasing access to funding or other resources will be insufficient to make any changes without a corresponding strengthening of local governmental institutions. One prevalent example where this is the case can be found in the Solwezi local council which has been historically marginalized on a national scale due to its minimal population size. According to Bebbington et al. (2018), unlike the Copperbelt, "Solwezi has shown no signs of emerging urban politics that link it to the national level." Strengthening the Solwezi local council and integrating it further into the local population by increasing citizen participation in its decision-making process is a necessary prerequisite for decentralization to provide benefits to the area under its purview.

Zambia should not let the shortcomings of its previous decentralization efforts discourage it from pursuing related policies in the future. The experience of other extractive-heavy economies such as those of Ghana, Peru, and Bolivia suggest that reconsideration of decentralization has the potential to benefit Zambia if implemented correctly. In theory, localities would have increased control over the distribution of resources and would be able to utilize them to better target their unique community needs. Furthermore, lag time between formation of new settlements and the planning of their development would be significantly reduced as local governments would be empowered to play a larger role in the process and have access to increased resources to do so.

Specifically in regards to the governance of health systems, autonomous district units would oversee all functions related to the purchasing of supplies and provision of health services. This would allow local administrations to determine the specific needs of

their localities and tailor their expenditures to better address any development deficits or areas lacking in resources. For instance, in the healthcare sector of the North-Western Province, the district governments would be able to channel resources to areas in which they have extreme shortages, such as highly trained medical personnel and essential drugs. This allows municipalities to identify and address the most pressing issues facing their locality, as opposed to having a decision imposed on them by an external actor.

Within such a system, it would be prudent to include a review procedure at the national level. Under decentralization, the national government would still be providing funding for district healthcare expenditures. Such allocation should be as fair and equitable as possible, taking into account not only population measures but also development needs and current healthcare deficits. Currently, the national budget allocation formula for healthcare financing "combine[s] equity-enhancing and status-quo maintaining elements whose overall effects may prevent achievement of greater geographic equity" (Ministry of Health et al., 2015). Yet, only a small portion of the health budget is subject to the equity-enhancing element and the historical budgeting in hospital resource allocation has only served to exacerbate underlying socioeconomic inequalities. Thus, an adjustment of the national allocation formula to consider more factors related to regional development and health indicators would ideally serve to provide fairer health care financing and more equitable health outcomes. Additionally, national guidelines should be set to provide certain budget ceilings and floors in an attempt to limit corruption and other gross misuse of funds. Within the bounds of such guidelines, it would be the responsibilities of the district and local administrations to determine the precise allocation of their resources in a manner that maximizes the benefits to their communities.

Linked to decentralization reform within the national healthcare system, our findings suggest that radical changes are necessary in the distribution of healthcare expenditure. Previous literature has found that administrative expenditure plagues the government at the national level as bureaucratic emoluments take over 60% of the national public sector budget, coming at the expense of social investments (Bebbington et al., 2018). Focusing on healthcare, the Ministry of Health et al. (2015) have found that an increasing proportion of public resources are going to administration rather than service provision and that Ministry of Health facilities at all levels are more labor intensive than their mission

and for-profit counterparts. This has resulted in a large amount of resources spent on personal emoluments in particular, which is unsustainable and decreases the amount of resources available for service delivery.

Analyzing health expenditure data in the North-Western Province over the period 2006 to 2016, we found that only a small fraction was categorized under "Health Service Delivery" with the vast majority dedicated to personal emoluments and various administrative purposes. From 2010 onwards, the North-Western Province health expenditure used for personal emoluments and administrative functions consistently exceeded 85%, reaching a high of 91.6% in 2014 (Figure 15). Considering the shortage of drugs and trained medical professionals, this is an excessively high amount being spent on administrative purposes. Thus, a re-evaluation of the distribution of provincial health expenditures should be undertaken in order to determine areas in which funds can be diverted towards in order to better address the needs of the province's population through health service delivery. In particular, funneling increased financial resources to obtaining more drugs to lessen the severity of the extreme drug shortage stands out as one area in which reallocation of resources holds a great deal of potential in benefiting community health.

Thus, reforms in the health sector hold great potential to improve the provision of healthcare services in both the North-Western Province as well as Zambia as a whole.

Mineral revenue sharing mechanism

A second policy implication deals with a potential mineral revenue sharing mechanism as an alternative distribution strategy for mining revenues. Currently, mining revenue from the North-Western Province flows through the national treasury and is then redistributed to provinces predominantly based on population size. This overlooks varying developmental needs and deficits across provinces and contributes to unequal access to social services, such as healthcare, on the national level. By accounting for other factors when determining mining revenue allocation, the Zambian government can fine-tune the distribution of resources to obtain a fairer and more equitable outcome.

One potential model for this may be found in Peru's Canon Minero which heavily considers derivation, or a region's economic contribution in terms of revenues from the collection of taxes on mining operations. Under this system, a large proportion of revenue is funneled back into provinces and districts where mines are located. Population level and basic needs are considered but only within mineral producing regions. Furthermore, Canon Minero transfers are required to be used for public investment projects aimed at providing universal services that benefit the community. In order to reduce some of the deficit between producing and non-producing regions that results from such a revenue distribution system, the central government transfers higher amounts of other resources to the district, provincial, and regional governments that contain negligible or no mining operations (Aresti, 2016). The argument in favor of such a system is that the communities affected most by mining activities should benefit the most as it is the natural resources of their land that are extracted, disrupting their livelihoods as a result. Yet, a system solely based on derivation is extremely vulnerable to corruption and has the potential to further perpetuate socioeconomic inequities between producing and non-producing regions.

In terms of recommendations for a mineral revenue sharing mechanism in Zambia, we believe the fairest and most equitable system would fall somewhere between the current policy in Zambia based on population size and the distribution formula outlined in Peru's Canon Minero solely based on revenue contribution. Such an allocation system should account for a variety of factors in determining distribution of mining revenues such as population levels, mining revenue contribution, infrastructure deficits, basic and developmental needs, and healthcare shortfalls among others. On one hand, this would account for the province's contribution to the revenue fund, basic needs in development, and provision of social services such as healthcare, ideally reducing inequalities in such areas. On the other, it would also accounts for population levels, ensuring that financing keeps pace with levels of growth. In theory, accounting for all these factors would allow for a fairer and more equitable distribution of mining revenues as both contributions and needs are taken into account when allocating resources.

An essential component for such a mineral revenue sharing system is revenue transparency at all levels, which is key in preventing rampant corruption in the country's administration. This was also a key element in the Peruvian model, with explicit guidelines

on distribution formulas and stipulations as to how the funds could be utilized once distributed. To implement such a system in Zambia, one possible method is to have an agency or committee devoted to ensuring such guidelines are adhered to and that the indicators used in the formulas are reliable and accurate. Additionally, an annual report detailing the breakdown of mining revenues and their allocation according the the revenue sharing mechanism would further increase transparency and contribute to the smooth functioning of such a system.

Thus, while determining the nuances of an exact formula and outlining feasible mechanisms of maintaining transparency would involve a great deal of time and effort, a mining revenue sharing mechanism in Zambia may help distribute resources more equitably and contribute to improving resource availability for disadvantaged areas. Given the focus of this paper, in particular such a system may provide additional resources to help alleviate some of the shortages in the health sector of the North-Western Province.

Aligning CSR initiatives with government development objectives

Another possible policy implication is the alignment of CSR initiatives with government development plans. Currently, public and private efforts are separate and independent of each other, leading to fragmented development and counter-productive efforts that do not benefit the communities as a whole. With government efforts lacking and the increasing perception that the province has not been getting its fair share of the national budget and mining revenues, community members and stakeholders have begun looking towards mining companies' CSR efforts as a catalyst for development. In theory, CSR efforts are designed to fulfill basic ethical and environmental standards. In Zambia, CSR has taken on a much more profound role in development, creating physical and social infrastructure in areas where the mining companies operate (Negi, 2011) . As such, Kesselring (2018) contends that the state abstains from investing in the areas where mining companies operate, expecting the mines to take on the responsibility of developing the region and taking care of the residents. A quote from one of our interviews with a community member illustrates his view on the role of government in the area: "In North-

Western Province, government is absent" (Interview of community member of Caritas Zambia)

Despite the absence of government as a social provider in the region, mining companies have no legal obligation to follow guidelines or developmental objectives. As a result, the few developments that do come in the region are often ineffective and serve to benefit the mines more than the community itself.

An examination of the CSR efforts undertaken by Kansanshi clearly shows this pattern. In 2006, the Kansanshi mine set up the Kansanshi Foundation to oversee and undertake their CSR activities. Around that same period of time, First Quantum Minerals Ltd. reported over $3 billion in revenues from the Kansanshi mine, amounting to $2 billion in operating profits, but their CSR activities accounted for a measly $1 million (Negi, 2011). Many local community members are dissatisfied with Kansanshi as their CSR efforts - consisting of bore well digging, building school blocks, constructing a market - have been "piecemeal in nature," without significant projects like a hospital, and secretly for the benefit of the mines instead of the community (Negi, 2011). For instance, the Kansanshi Foundation invested in boreholes, meant to provide water to nearby villages, in order to monitor groundwater levels in the mine to prevent floods which would negatively affect the mine's production.

These ineffective CSR initiatives, coupled with the absence of government investments, lead to a general lack of development in the area. The government expects the mines to take on developmental responsibilities which the mines have no obligation to follow, creating a void in the region as to who brings in growth. In order to facilitate sustainable growth, CSR initiatives undertaken must be aligned with developmental objectives of the region, combining public and private efforts to foster coherent growth. Where the mines are unwilling to develop and invest because they do not directly benefit, government should be stepping in to compensate and complete developments, leading to growth that is able to reach the wider population beyond the mining areas in the province. This would require increased communication and cooperation between the mining companies and government institutions at all levels.

In its partnership with mining companies' CSR efforts, the government must ensure that it does not rely too heavily on such efforts as "CSR creates new forms of dependencies"

(Kesselring, 2017). Becoming too reliant on CSR activities is a slippery slope for communities as once the mining corporations have exhausted the natural resources in a region, they are privy to exit the region, leaving the communities with underdeveloped government service delivery mechanisms. Thus, the government should advance its own development agenda and put forth its own initiatives in conjunction with the CSR efforts of the mines to produce cooperative development strategies that benefit the government, the mines, and most importantly, the communities involved. In this way, the government would strengthen its own capacity to provide services to the communities, setting up a sustainable model that would continue to function even after the departure of extractive industries from the region.

Inclusion of community stakeholders in new developments

Finally, it is imperative that the planning of new developments in the area includes community member stakeholders. Currently, communities often have no control or say in developments in their areas, resulting in ineffective developments that do not address their needs. Cheelo (2008) supports the sentiment that there has been a lack of inclusion of mining communities in decisions that affect their development. He found that local communities surrounding mining areas felt that communication channels could be represented by a horizontal line between government and the mining company. People interviewed in the study believed communication should conform to more of a triangle shape in order to incorporate the local people who are directly impacted by the mine's presence. One of the community members interviewed in this study commented:

> Us as a community had no role to play in the negotiations of mining investments at Kansanshi – we did not participate at all (Cheelo, 2008).

Furthermore, communities currently do not have the ability to hold companies and local government accountable for their actions. As Van Alstine et al. (2013) found, most of the interaction between company and community in the Kansanshi mine area had been initiated by the mine or its contractors, with little to no initiative on the side of the

community to bring their needs to the table. The study notes the lack of capacity of communities to formulate more community-driven needs in the area and highlights the lack of non-governmental organizations and community-based organizations willing to undertake such efforts (Van Alstine et al., 2013). Most organizations may take a stance in early advocacy stages but fail to engage in advocacy on an on-going basis regarding these developmental needs. As such, developments by the mines in these local communities have been few and far between while not addressing the needs of the communities fully.

Thus, inclusion of communities in the planning of new developments is key to bringing about more sustainable and relevant growth. This inclusion could manifest in a multitude of ways. Van Alstine et al. (2013) suggests the formation of community project committees, set up by mining companies to implement CSR projects, as well as quarterly stakeholder meetings with project committees to fully represent the communities and their needs. Another method of inclusion is to increase efforts from civil society and non-governmental organizations in advocacy and hold private actors accountable. Through strong and sustained advocacy efforts, communities are given a platform to voice their concerns and hold private actors responsible for their actions. Whatever form it takes, inclusion can empower local communities to take the initiative and bring their issues to the discussion table rather than wait for developments to be externally imposed on their locality.

None of the formulated policy implications in this section can or should be considered lightly, as the complexities of each demand careful planning and implementation in order to produce the intended effects. There are a great deal of moving parts to each but if carried out successfully, they have the capacity to address some of province's most pressing health issues.

VII. Conclusion

The mining industry has the potential to be a legitimate tool for development. If properly governed and utilized, the mining industry would not only contribute to national development efforts through revenues and tax contributions but also benefit local

communities through social provision and infrastructure development. However, these developments have not yet arrived in the North-Western Province.

Since the introduction of mining in the region, access to healthcare has remained sub-standard, with most of the population in the region unable to access the existing facilities and resources available in the region. There are many barriers that prevent the majority of the population of the North-Western Province from accessing quality healthcare, some of which have been explored in this paper. The health sector in Zambia and the North-Western Province must take into account the reality facing the communities in order to achieve effective and sustainable developments.

The responsibility of addressing the issues presented in our findings does not fall to one single actor alone. It is the responsibility of the community to hold government and companies accountable for their actions. It is the role of government to provide adequate protections and services to its citizens and not stand by the wayside while deferring its obligations to mining companies. Government must strike a balance between encouraging foreign investment and industrial capacity-building and protecting its citizens from exploitation and the negative externalities such industries create. Instead of disjointed efforts undertaken by individual institutions, endeavors must be a collaboration between state, company, and community in order to have lasting impacts. Only through such joint efforts can the people of North-Western truly benefit from mining activities.

VIII. Limitations

We encountered multiple limitations in this study. One major limitation was that we were unable to personally visit the North-Western Province to study the effects of mining on the ground. While we were able to interview stakeholders from the North-Western Province who had come to Lusaka or who spoke with us on the phone, we were not able to perform extensive fieldwork and get a feel for the situation in the province first-hand.

Another limitation lies in our collection of data and statistics on the North-Western Province and Zambia as a whole. Our analysis was limited to data that we could find online or through our interviews and some statistics were outdated or not as recent as we would have preferred. This is particularly true of health data regarding the availability of drugs

and the numbers of health workers. In the same vein, our research was limited by the statistics available insofar as certain analyses and comparisons were impossible due to the lack of relevant data either because such information had never been collected or never was publicized. For instance, we had planned to look at urbanization by district in the North-Western Province and how it correlated with health indicators but were unable to find reliable urbanization data by district for more than one year.

Our qualitative interviews were limited to professionals and people considered "experts" in the field. This restricted the range of viewpoints we were able to incorporate into our research when discussing our findings and formulating our policy implications.

A fourth limitation we encountered was the short timeline we faced in performing our research and completing the project. Our two month time constraint limited the possibilities of what we could feasibly do and with more time we would be able to look further into the potential of our policy implications as well as interview more stakeholders and collect more data to bolster and expand our findings.

Finally, an important limitation in our study is the lack of causal linkages between the introduction of mining and some of our findings. While mining clearly affects the formation of new settlements and inequity of resource distribution, the causality between mining and the observed shortage of drugs and human resources remains unclear. There may be some correlation as these findings were observed in the period of time following the introduction of mining during which the mining industry was beginning to take off. Within this study, however, we could not definitively conclude the presence or lack of a causal link between mining and these observed effects, thus limiting the scope of our findings.

IX. Acknowledgements

We would like to thank our partner organizations, the Council of Churches in Zambia, the Southern Africa Institute for Policy Analysis and Research, and Cornell University for giving us the opportunity to conduct this research.

We would also like to extend our gratitude specifically towards Marja Hinfelaar, Dale Mudenda, Andisen Zulu, George Chibwana, Chipili Shibwela, Joseph Lungu, all of our interviewees, and everyone who has supported us throughout our time here.

Appendix

Figure 1. Zambian copper production and world prices from 1930 to 2010. (Whitworth, 2015)

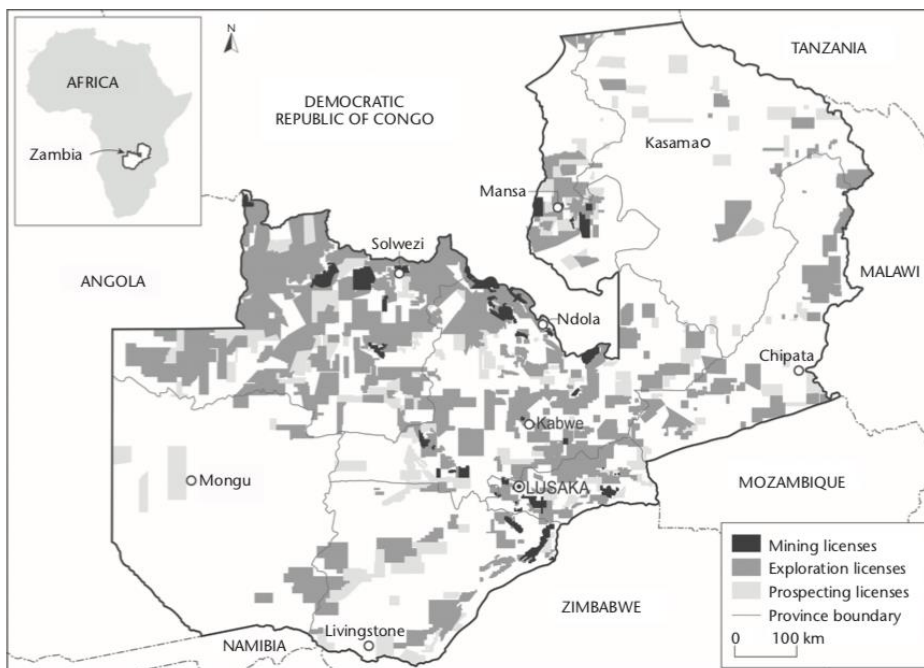

Figure 2. National distribution of mining licenses in Zambia in 2017. Highlights the heavy concentration around the Copperbelt and the North-Western Province (Bebbington et al., 2018).

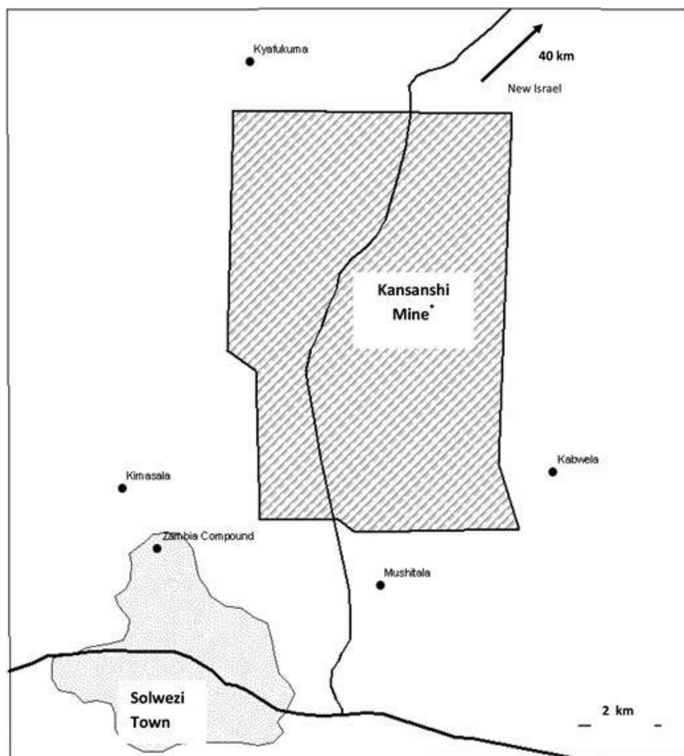

Figure 3. Map of the Kansanshi mine and adjacent communities (Van Alstine et al., 2013)

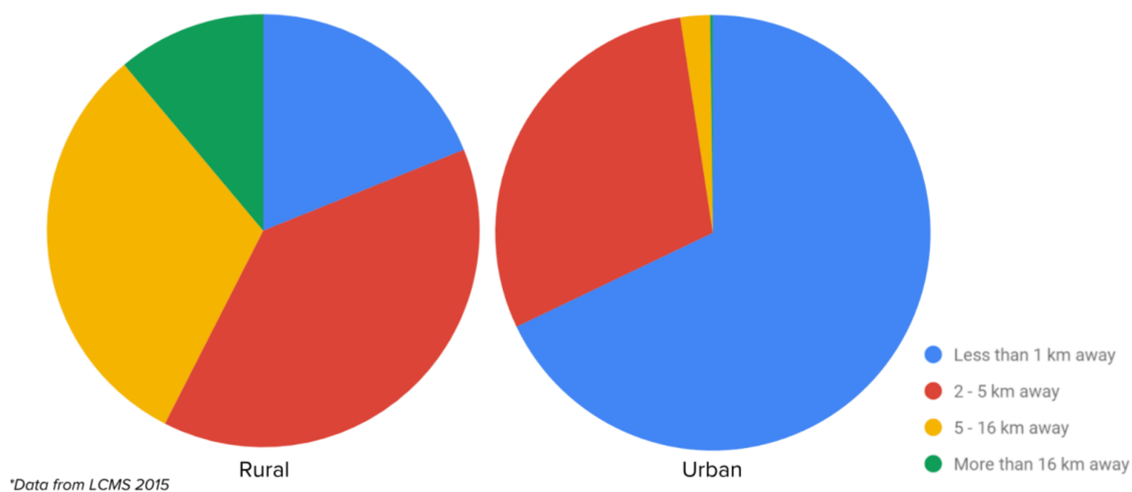

Figure 4. Percentage of urban and rural households by distance to nearest health facility. (Central Statistical Office, 2004, 2006, 2010, 2015)

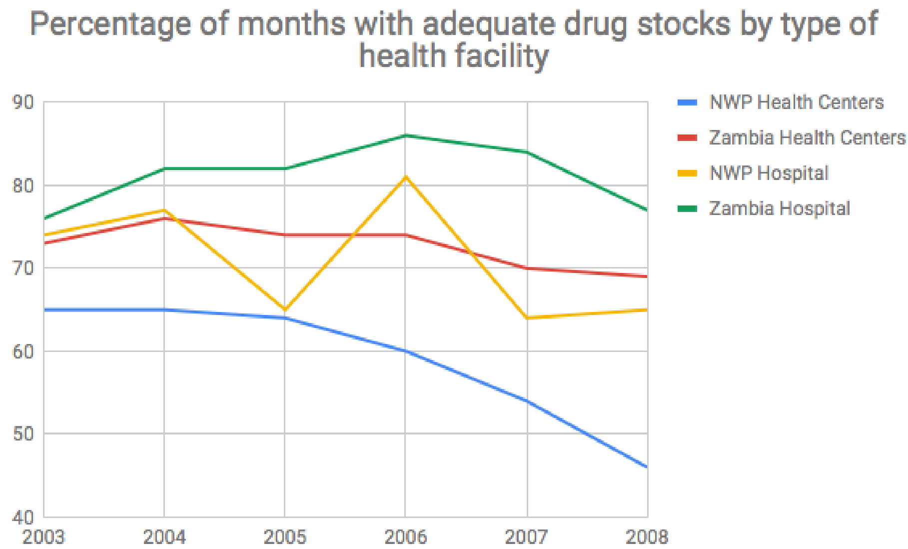

Figure 5. Percentage of months with adequate drug stocks in health centers and hospitals from 2003 to 2008. (Ministry of Health, 2005, 2009, 2011, 2013b, 2014)

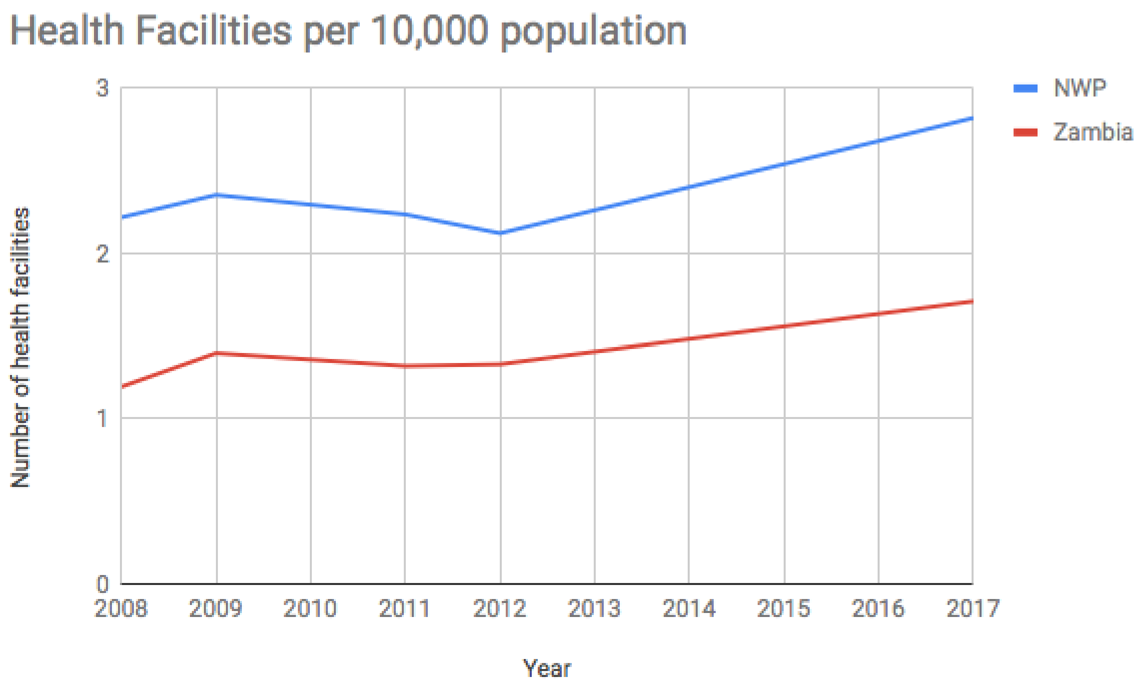

Figure 6. Health facilities per 10,000 population from 2008 to 2017. (Ministry of Health 2013a, 2017b)

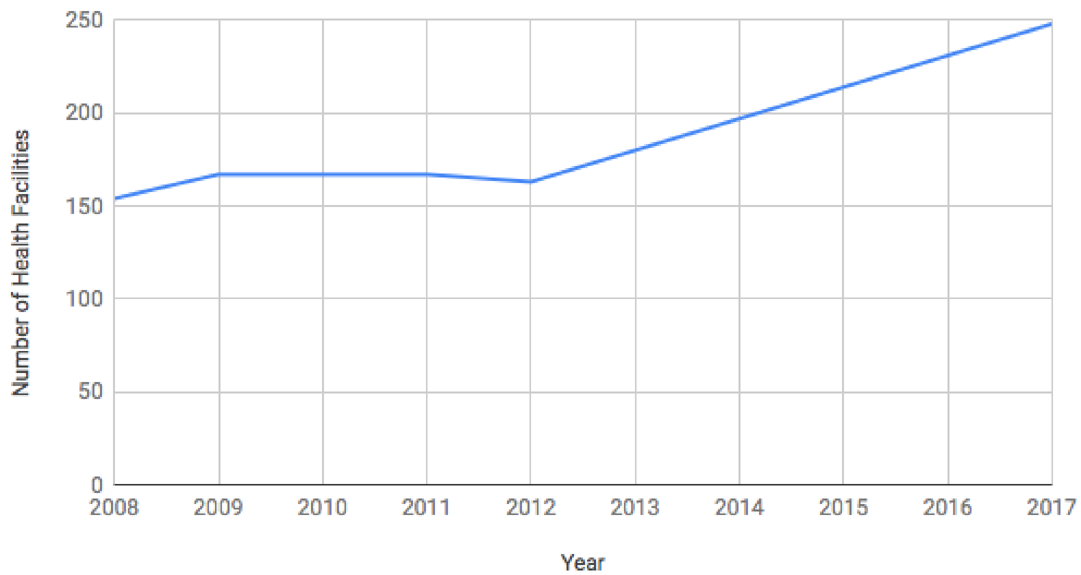

Figure 7. Number of health facilities in the North-Western Province from 2008 to 2017. (Ministry of Health 2013a, 2017)

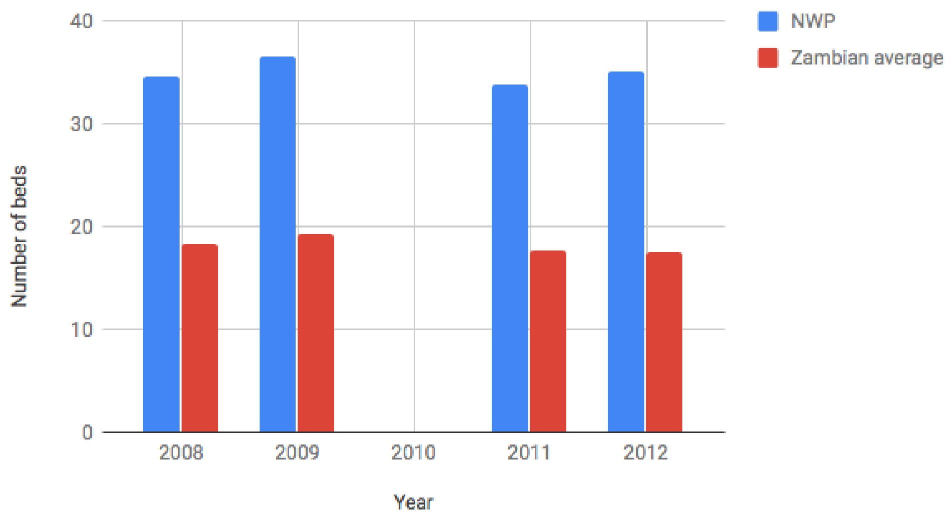

Figure 8. Health facilities' beds per capita from 2008 to 2012, with the exception of 2010 for which no data could be found. (Ministry of Health, 2005, 2009, 2011, 2013b, 2014)

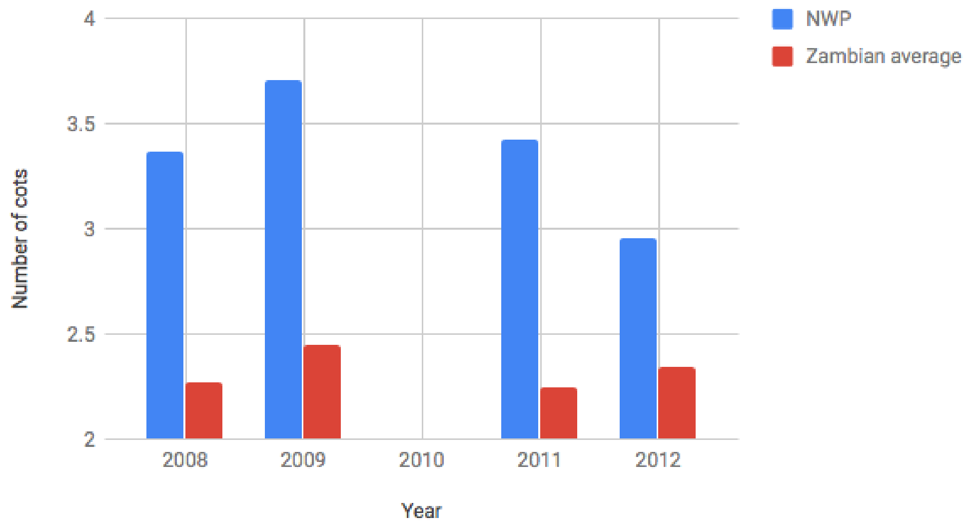

Figure 9. Health facilities' cots per capita from 2008 to 2012, with the exception of 2010 for which no data could be found. (Ministry of Health, 2005, 2009, 2011, 2013b, 2014)

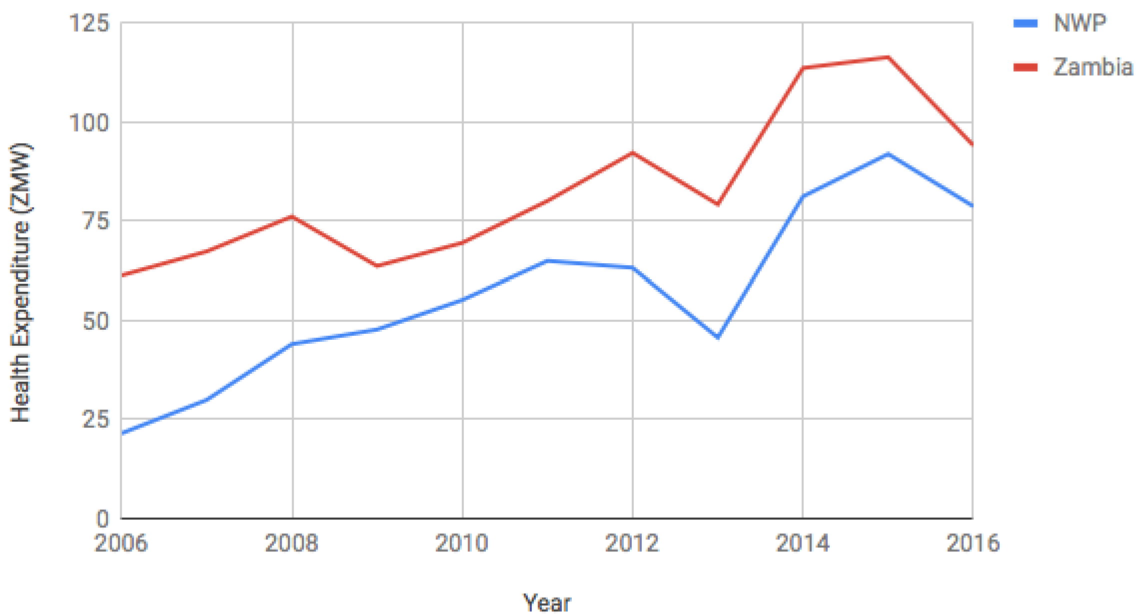

Figure 10. Health expenditure per capita (adjusted for inflation) from 2006 to 2016. (Ministry of Health, 2017a)

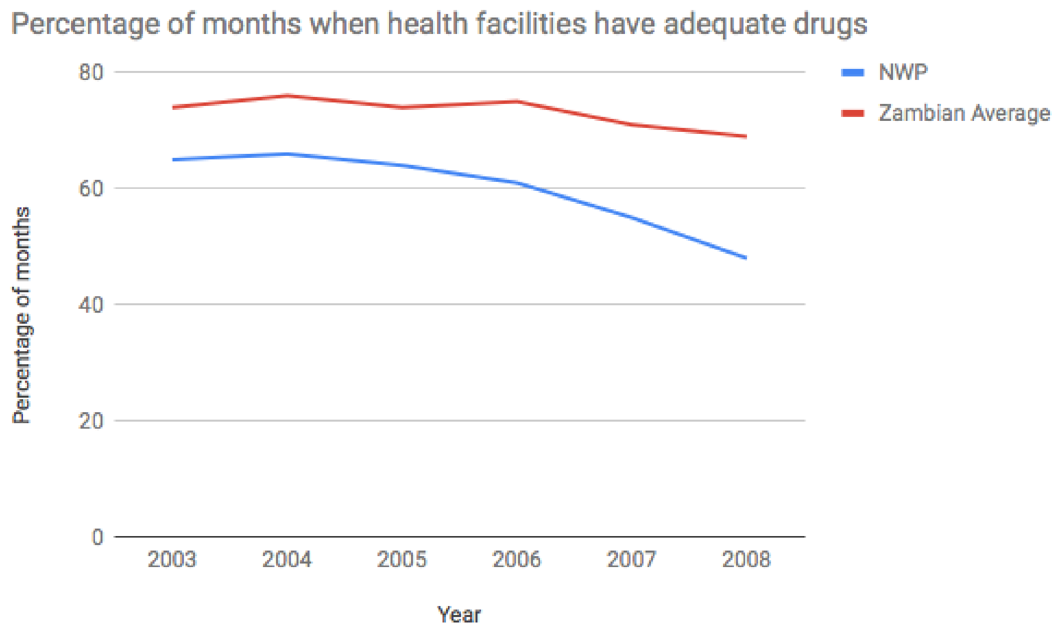

Figure 11. Percentage of months when health facilities have adequate drugs from 2003 to 2008. (Ministry of Health, 2005, 2009, 2011, 2013b, 2014)

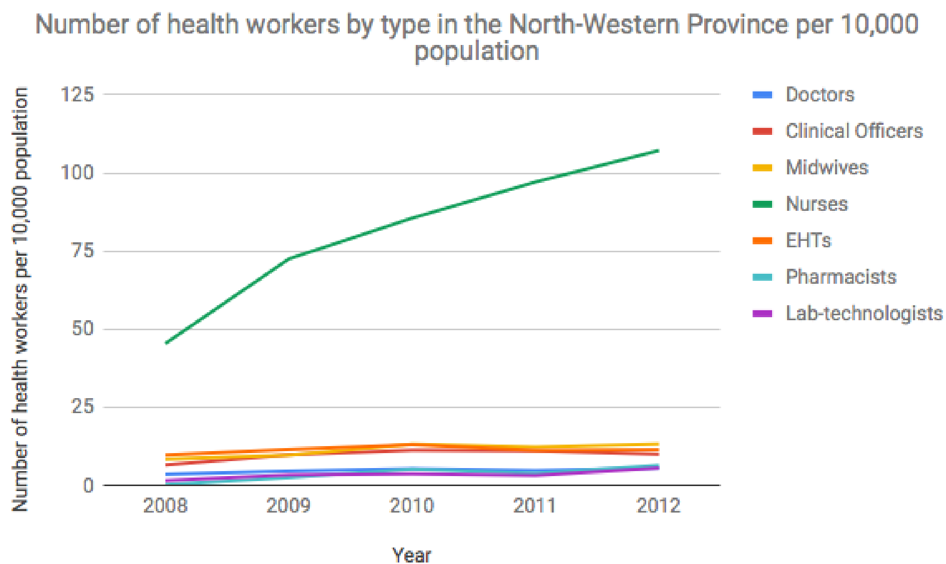

Figure 12. Number of health workers by type per 10,000 population in the North-Western Province from 2008 to 2012. (Ministry of Health, 2005, 2009, 2011, 2013b, 2014)

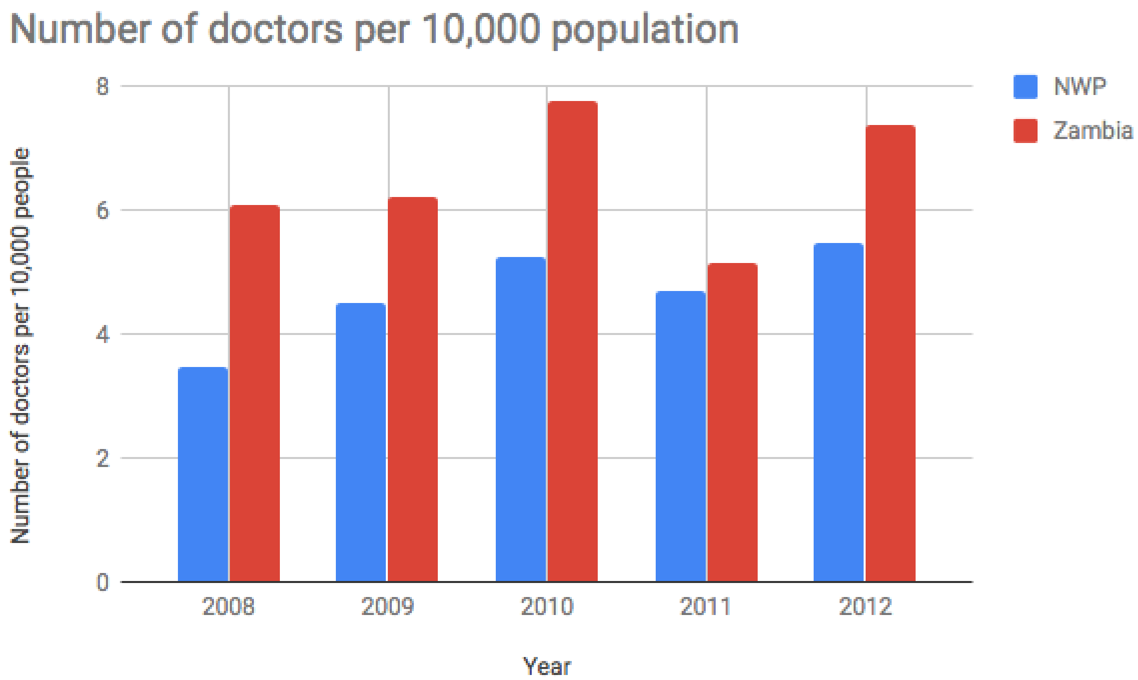

Figure 13. Number of doctors per 10,000 population from 2008 to 2012. (Ministry of Health, 2005, 2009, 2011, 2013b, 2014)

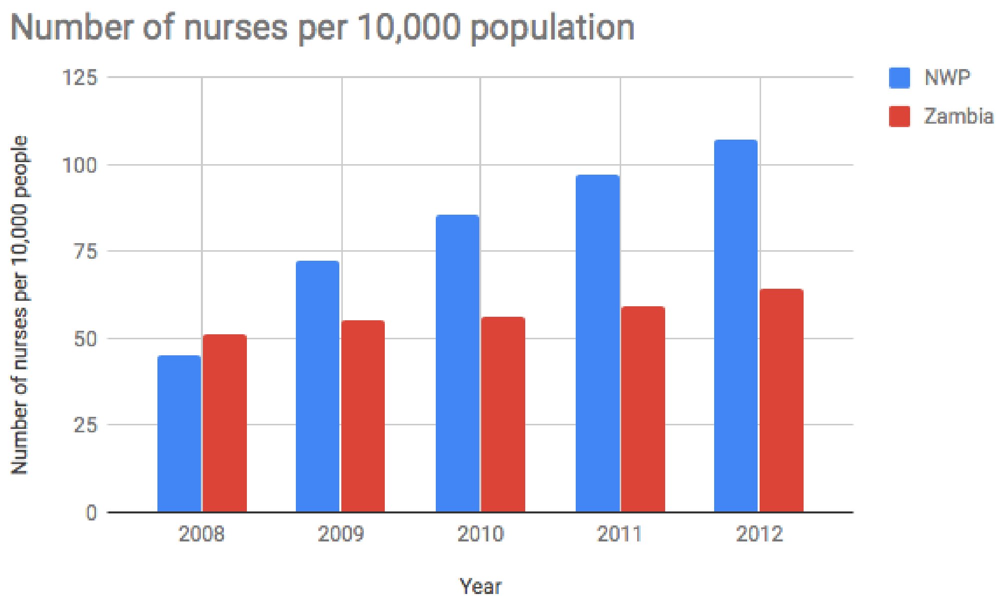

Figure 14. Number of nurses per 10,000 population from 2008 to 2012. (Ministry of Health, 2005, 2009, 2011, 2013b, 2014)

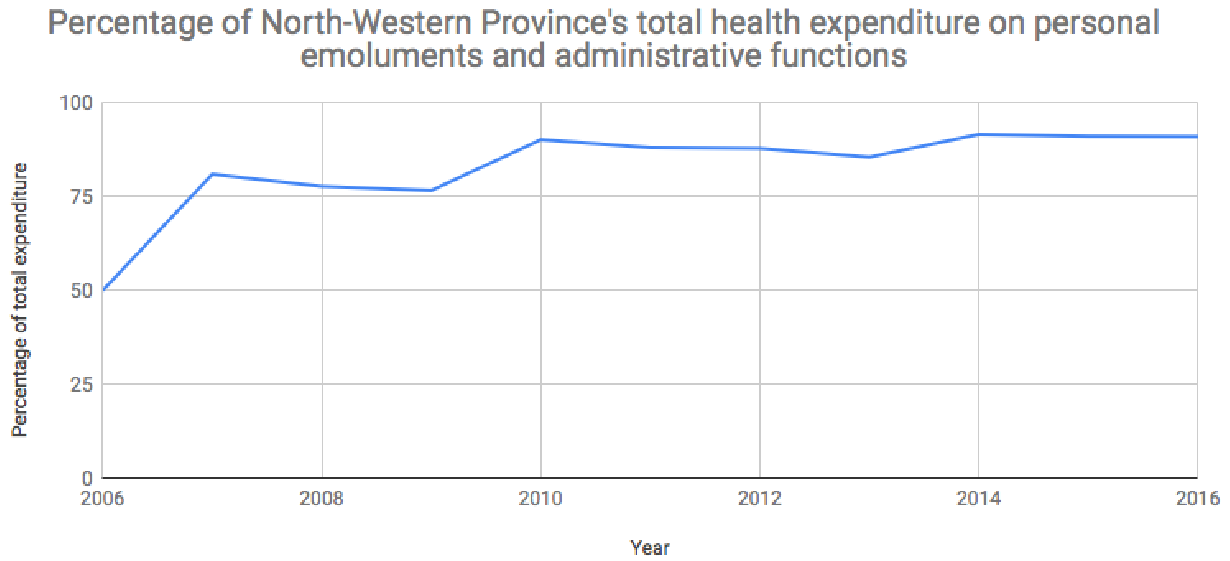

Figure 15. Percentage of North-Western Province's total health expenditure spent on personal emoluments and administrative functions (Ministry of Health, 2017a).

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