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Title: *Mine workers social recognition of the environmental costs of mining:*

A case study of Mopani copper mine and Kankoyo Township, Mufulira-Zambia

Dissertation submitted to the Faculty of Humanities of the University of the Witwatersrand

Department of Sociology/ Global Labour University, in fulfilment of the requirements for the Degree of MA Labour and Development, Labour Policy &Globalization: 2015

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Abstract

This study investigates the environmental costs of copper mining in a mining Township of Kankoyo in Mufulira, Zambia. It investigates the ways in which the mine workers in this community experience, assess and respond to the pervasive environmental degradation caused by mining operations. The study indicates that the people of Kankoyo have an implied understanding (physical experiences e.g. smoke, dust etc.) of the risks in their environment but lack explicit knowledge (long term effects). Second, the working class are now in an awkward position between participating in activism against the company that pollutes their environment and the need to keep their jobs. Third, experiences with a polluted environment have divided the Kankoyo between those who engage in community mobilisation (the unemployed) and those who don't because they want to protect their jobs (the mine workers). As experiences take a gender dimension, women tend to suffer more due to the gender roles they play. Fourth, given their helplessness, the people of Kankoyo now plead for social services not in social justice terms but as a compensation for the pollution suffered. This appears as if people want to be paid for their exposure to a pollute environment.

The core conclusion is that workers understand environmental threats but: (a) they have little awareness of the long-term effects and (b) they tend to minimise them. For these workers their economic security i.e. employment, is primary and they prioritise the immediate over the longer term, thus (c) they have not responded to this issue in an organised way, rather their unions tend to focus on traditional workplace/pay issues. In addition, state and environmental organisations' responses are inadequate. Consequently, the community is forced to accept the negative environmental impacts on their lives and the environment.

Therefore, the study makes the following arguments: (a) Mineral resource led development in Zambia has failed. Instead, it has led to devastating environmental and health impacts on the nearby communities; (b) that the provision of social services and housing to the mine workers, and revenue to the government only served to divert attention from the long term and ongoing environmental degradation that has taken place overtime. The slug dams, the accumulated dust heaps, leach plants and long term environmental degradation on the copperbelt attest to this; (c) that the corporate policy

on housing only served the interests of the mining companies by stabilising the workforce without regard for the arising health impacts; and; (d) privatisation has increased the vulnerability of the working class to environmental costs of mining. In the end, from the shattered hopes of a good life ‘modernisation’ emerges in the words of one respondent a ‘development’ of ‘environmental suffering’, as Kankoyo remains a ‘bomb waiting to explode’.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

Signed by



James Musonda (Mr.)

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My name on the first page of this thesis gives me great pride, honour and humility. Yet it is misleading because research of this length and breadth can only ever be a collective effort. Some of the people will never be aware of the value of their enormous contributions. It is also unfortunate that this short passage cannot manage to express my gratitude and cannot ever bear true witness to the debts I have accrued in the past one year. I make no apologies for its length, but I do apologise for any omissions. It is with great pleasure – and great humility – that I acknowledge some of the support I have received in preparing this thesis.

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I therefore dedicate this report to my late mum, Foster Mutale Musonda who I will always miss and my tears will never dry, wife and children. Let me also acknowledge my friends, classmates lecturers and many others too numerous to mention who contributed in many ways to the successful completion of this study.

Abbreviations

CULP	Copperbelt Urban Livelihood Project
COSATU	Congress of South African Trade Unions
CTPD	Centre for Trade Policy and Development
DA's	Development Agreements
DECOP	Development Education and Community Project
IFI's	International Financial Institutions
IMF	International Monetary Fund
KCM	Konkola Copper Mines
MCM	Mopani Copper Mines
MUZ	Mineworkers Union of Zambia
NGOs	Non-governmental Organisations
NUMAWU	National Union of Miners and Allied Workers
TB	Tuberculosis
TNCs	Transnational Corporations
UN	United Nations
US	United States of America
ZCCM	Zambia Consolidated copper Mines
ZESCO	Zambia Electricity Supply Corporation

1 Chapter one: Introduction

The general aim of the project is to understand the environmental conditions in which the people who produce copper ore that makes up cables and wires worldwide live. The research focuses on the experiences and social recognition (understanding and perceptions) of environmental costs (mining waste) by the mine workers living near the mines. It is based on research conducted in Kankoyo Township in Mufulira Zambia in 2015 and 2016. This research utilizes three data collection techniques: in depth semi-structured interviews, focus groups and participant observations. The main purpose of this report is to bring into view the contestations around the long term entanglements of mining capital and environment and the working class community affected by mining operations. The report makes six main arguments:

a) While mining promised or was expected to bring about a better life or development it has generally failed to deliver. Instead, it has created more problems.

b) Mining has had a severe negative environmental impact on the mine workers lives and their communities. This is despite the fact that mine workers are the people behind the successful operations of the mines.

c) The provision of social services (free education, health, recreational activities, refuse collection etc.) were a mere green wash that blinded the affected communities from a fuller understanding of the long-term environmental and health risks caused by mining operations. Therefore, risks were obscured by the economic benefits.

d) At present the people of Kankoyo have an implied understanding (physical experiences e.g. smoke, dust, and bitter taste etc.) of the risks in their environment but lack explicit knowledge (understanding of the long term effects). But due to poverty and fear of unemployment they tend to minimise the long term health risks over these economic benefits.

e) Privatisation has worsened the vulnerability of working class communities to environmental suffering.

f) The corporate policy on housing for mine workers near the compounds has been an environmental disaster. How did this come to pass?

As many Zambians concentrated on maximizing economic benefits from mining, the environment was overlooked. In the process copper mining led to pervasive environmental degradation in the nearby communities, rivers and other natural environments. Consequently, environmental impacts of mining experienced in the nearby Townships today result from both historical and ongoing operations. But they have been worsened by a severe lack of adequate environmental laws and regulation to mitigate this impact (Lindahl, 2014, p. 3). Kankoyo Township in Mufulira, which houses Mopani Copper mines, is one of the worst affected. The prevalence of air and water pollution, soil contamination, siltation, geotechnical issues, and land degradation are evidence of this (Lindahl, 2014; Mwaba, 2013). More than 3,000 housing units living near the mine plus the main town suffer from emissions of sulphur dioxide, causing excessive air pollution.

The injection of sulphuric acid solution into the ground to dissolve the copper ore directly in the deposit results in pollution of the underground water. Yet this is the main source of domestic water supply in Mufulira. In addition incidences of spillage of acid into the rivers on which people depend for drinking water supply have been reported (Balance, 2010). Soil and land pollution results from the emissions of Sulphur dioxide. This inhibits vegetation growth, except for trees such as avocado and mango that are resistant. The pipes that evacuate mining waste (toxic tailings) leave the mine, cross several Townships, are totally unprotected. Thus increasing the likelihood of pollution due to leakages (Balance, 2010). As a result of underground blasting, some people have been forced to leave their homes as they have collapsed.

But, to my knowledge, the relationship between mining, development and the environment has not yet been taken explicitly as a subject of investigation and reflection. The often storied account of Zambia's social economic transformation has been on mining and development or lack of it (Cunningham, 1981, p. 45; Ferguson, 1999; Ollawa, 1979), dependency on copper and the boom and bursts (Fraser & Lungu, 2007; Gewald, Soeters, Fraser, & Larmer, 2010; Larmer, 2007), regulation of FDI (Haglund, 2008) the struggles of the mine workers and trade unions (Bates, 1971;

Burawoy, 2014; Larmer, 2007; Lee, 2009; Mwendapole, 1977; Parpart, 1983). Here it is read through the lens of mining's impact on the environment and the people who work hard to keep the mine going. There is a fairly sizeable literature detailing the relationship between mining and environment (Balance, 2010; Chipatu, 2011; Fraser, 2010; Kangwa, Lekunze, & Sweden, 2008; Nakana, 2013; Ndulo, 1986). But none of these specifically addresses the experiences, understanding and responses of mine workers to the pervasive environmental degradation caused by mining operations.

1.1 Background

According to Bradley (1952), the nineteenth and early twentieth century European prospectors' accounts show that extensive ancient copper mining had long been practised in the region between the Zambezi and Congo basin. It has also been speculated that mining activities increased during the slave trade but became dormant with the abolition of slavery. Then, in the early 1930s the Northern Rhodesian Copper mines exploded onto the world investment stage as copper deposits were discovered by European explorers. This was decades after the European 'scramble for Africa'. What was once the graveyard of mining enterprise (Frederiksen, 2010), or where copper mining was considered unviable or unprofitable (Cunningham, 1981) became the birthplace of a modern mining field. Consequently, abundant investment flowed in, cutting edge technologies were deployed and a modern mining region blossomed (Ferguson, 1999; Frederiksen, 2010). Between 1930 and 1964 Northern Rhodesia was transformed from a colonial backwater into one of the world's largest exporters of copper (Parpart, 1983).

Frederiksen (2010) notes that within a few years of their opening the new mines were very profitable, and produced wealth on a massive scale. New modern garden cities had sprung up across the Copperbelt complete with the modern amenities one would expect of the developed world: cinemas, tennis courts and golf courses were built in the heart of the African interior (Ferguson, 1999; Frederiksen, 2010). In the words of Ferguson, the copperbelt could only be described as a 'wonderland', a marvel of modernity and progress in the heart of the 'dark continent' (Ferguson, 1999). Citing Schumaker (2001), Frederiksen (2010) observes that researchers came from far and wide to study the novelty of 'modern' urban populations of Africans in the heart of rural 'traditional'

Africa. The engineers and financiers who enabled this transformation were lauded as heroes in the industry, knighted, awarded prestigious industry medals and their names written into the geography of the region (Wilson, 1992 in Frederiksen, 2010).

One salient outcome of this spectacular progress was that it raised hopes among the local people of a better life and modern cities. These hopes were enhanced after independence as the government embarked on country wide and ambitious projects of developing hospitals, schools, universities and provision of subsidies to state owned manufacturing companies (Cunningham, 1981; Ferguson, 1999; Ollawa, 1979). ZCCM that was formed in 1982 (Larmer, 2007) supplied amenities such as education to miners' children, subsidised housing and food, electricity, water, transport and burial costs for the dead. The mine provided community services such as road maintenance, refuse collection, providing cafeterias, bars and social clubs, youth development schemes etc. (Fraser & Lungu, 2007, p. 8).

Therefore, the more than two decades of economic decline between 1974 and 1994 following the oil and copper crises (Cunningham, 1981; Ferguson, 1999; Fraser & Lungu, 2007) dampened the hopes and expectations of a better life of many Zambians. The per capita income in Zambia fell by more than 50 percent during the period. Poverty was as high as 68 percent and 55 percent of Zambians lacked sufficient income even to meet basic nutritional needs. The country fell in the hierarchy of developing nations (Cunningham, 1981; Ferguson, 1999). However, the heightened expectations continued to exert pressure on the government to provide essential services. The food riots and protest in the late 1980s following the introduction of IMF/World Bank austerity programs is one such example. These claims were later to become important in determining the political outcomes of the country in the 1990s. The expression of frustrations that came from unmet expectations cannot be better summarised than by any other quote:

> "The basis for mineworkers' participation in industrial and Township-based activities designed to improve (or prevent the decline of) their living standards lay in a consciousness of their unwarranted exploitation, the inequitable distribution of the revenue generated by their hazardous labour, and the importance of this labour in the strategically important copper mining industry and, through it, national development" (Larmer, 2006, p. 295).

These expectations were important in determining the political future of Zambia leading to the 1991 elections. The United National Independence Party led by Kenneth Kaunda was replaced by Chiluba's Movement for Multi- Party Democracy. The new government embarked on a serious privatisation program (Fraser, 2010; Fraser & Lungu, 2007) as a way of finding solutions to the economic ills and thereby meet people's expectations. Twenty years after privatisation people still complain that they have not benefitted from mining investments in the country. Consequently, mineral resource led development in Zambia has come to be described as a 'myth', ambivalent, labour weakening and cause of class and gender inequalities.

However, the often forgotten element from the above analysis is the fact that as copper mining continued to develop, the landscape was transformed. Rivers were diverted, swamps drained, deforestation happened and nature was distorted as people and wildlife became displaced. While a number of authors have used modernity (Ferguson, 1999; Mususa, 2012), social economic welfare (Frederiksen, 2010; Negi, 2014) and labour (Bates, 1971; Burawoy, 1972; Larmer, 2006; Parpart, 1983) and class and gender (Parpart, 1986) as lenses through which mining development could be understood, nature has remained on the side-lines.

This study departs from the above important analyses and focuses on the ways in which mine workers in the mining Townships experience, assess (social recognition) and respond to the pervasive environmental degradation caused by mining operations. In addition, the study interrogates various factors at play in shaping and influencing these experiences, understanding and responses. Through these experiences, this study shows that the development or modernization (Ferguson, 1999) that politicians, IFIs and new investors advance have remained a far-fetched dream for many Zambians. Instead, whatever economic benefits that have arisen, have come at a huge cost to the environment that endangers human life. All the spectacular success of mineral resource development in Zambia has for the people of Kankoyo Township been lost in what appears to be a 'development of environmental suffering'. The objectives that follow guide this research.

1.2 Objectives

The main objective of this study is to explore Mopani mine-workers' social recognition of the environmental costs of mining, mainly in their communities and also to a lesser extent in their work place**;** in addition, the study specifically aims at:

a) Explaining how Mopani mine workers living in Kankoyo Township understand the externalized or environmental costs of mining on their communities;

a) To identify what factors contribute to or hinder their understanding of environmental danger;

b) To describe how mine workers who are routinely exposed to toxic hazards perceive their risky surroundings (where they live and also where they work);

c) To understand what set of practices accompany these feelings and cognitions;

d) To determine the residents' social recognition of the environmental costs of mining on humans and the community of Kankoyo; and

e) To explain why Kankoyo residents continue to live in the area despite the negative environmental impacts.

1.3 Justification and rationale

What justifies the undertaking of this research today? For many years of mining in Zambia little attention has been paid to the environment. The recent unprecedented boom in mining investment, which many commentators have compared to a 'new scramble for Africa', has a huge potential to worsen the environmental situation at a faster rate. Therefore, three basic reasons justify the importance of this research. The first is that Kankoyo Township continues to suffer from irreparable environmental damage arising from copper mining, in terms of soil degradation, air pollution, water contamination, potential health problems and diseases. To counter this requires a mass-driven transformative project or counter movement (Polanyi, 1944) from below to contest the industrial capitalist system. Therefore, this research's aim is to come up with knowledge to meet this objective.

Second is to create information that could equip residents to protect themselves from toxic mine waste. The lack of this knowledge amongst the community members has led to the establishment of settlements near the mines, scavenging in the mine dumpsites and the polluted streams and rivers that are known to be the main recipients of mine effluence. The continued utilization of the expansive but polluted wetlands by subsistence anglers attest to this (Chipatu, 2011). Finally, I hope to contribute to broadening the scope for a more thorough understanding of the possibilities for transformation from the current form of production that is detrimental to humans and the environment to more environmentally friendly modes of production and alternatives. The government, academic and economic discourse is skewed towards attracting foreign direct investment, particularly in mining, and to maximising resource output as if the earth was infinite. This dominant attitude needs to change and that can only come with adequate education, information and communication amongst stake holders and citizens who will drive the change.

1.4 The Research Question

- What is the mine workers' social recognition of the environmental costs of mining in their communities as well as in their work place?

1.4.1 Sub questions

- How do they make sense of their risky surroundings and cope with toxic danger?
- How do they experience environmental suffering?
- What is the relationship between this knowledge, their suffering, and their apparent collective inaction or action?
- What interactions have they had with environmental organisations and other stake-holders?
- How has that interaction influenced their understanding?

1.5 Definitions

- **Environment** refers to the natural or man-made surroundings at any place, comprising air, water, land, natural resources, animals, buildings and other constructions.

- **Environmental or externalised costs of mining** refer to the damage done to the environment by the industrial development system through resource depletion and pollution resulting from mining activities.

- **Pollution** means the presence in the environment of one or more contaminants or pollutants in such quantities and under such conditions as may cause discomfort to, or endanger, the health, safety and welfare of human beings, or which may cause injury or damage to plant or animal life or property, or which may interfere unreasonably with the normal enjoyment of life, the use of property or conduct of business.

- **Extractivism** refers to extractive mining of minerals, metals, oil and gas which results in accumulation of wealth by multinational mining corporations at the expense of the local citizens who suffer the consequences of the environmental damage, social inequality and poverty.

- **Social recognition** refers to the awareness or understanding by the community of environmental costs of capitalist production or ability to make links between them and ecological effects.

- **Environmental experience:** means the day to day awareness and physical contact and effects on people resulting from externalized costs of mining and pollution.

1.6 Structure of the report

This research report consists of six chapters. The first chapter provides an overview and a short introduction to the study and a background to mining and the environment in Zambia. It then outlines the research objectives, the rationale and justification for the study, research questions and operational definitions. This chapter thus sets the torn for a detailed discussion of mine workers social recognition of the environmental costs of mining in their community.

Chapter two provides the literature review investigating the relationship between mining and development (i.e. a good life, modern cities, secure jobs and strong unions etc.), in Zambia. This chapter argues that the spectacular growth of copper mining in Zambia led to heightened expectations of modernisation and hopes for a better life among people living in the then Northern Rhodesia and now Zambia. However, the economic failures arising from mining extraction and trade have dampened these hopes. This has brought about a wide range of meanings and interpretations of development. On the other hand, while the people and the state became entangled in their expectations of a better life, the environment was overlooked. Consequently the environment became the biggest victim of the battle between people's expectations and the benefits arising from mining. This chapter thus presents a vivid account of these expectations and impacts of mining exploration, extraction and exportation.

Chapter three outlines the research design. The study is based on a qualitative methodology. The study utilises three sources of data – focus group discussions, semi-structured interviews (21 interviews), and participant observations recorded using a diary. The data was then analysed using an eco-Marxist approach.

Chapter four is the first of two chapters that present the findings of the research. This chapter describe the many real problems and difficulties that the residents of Kankoyo face in their daily lives, as well as their helplessness in the face of these alarming short and long-term risks. The chapter highlights the impacts of sulphur dioxide on people, water and houses in terms of corroded roofing, washed away paint etc., as well as the broken houses due to blasting. The chapter concludes that long term exposure to mining pollution has severely affected the lives of the people of Kankoyo.

Chapter five is the second of the findings chapters and its purpose is to answer the research question 'how do Mopani mine workers living in Kankoyo Township understand the externalised or environmental costs of mining on their communities'. It also explores community responses to these environmental hazards as well as responses from the trade unions, community organisations and the state. The chapter shows that while people are conscious of the day to day effects of the externalised costs of mining in their daily lives, they tend to minimise them in preference for economic benefits. In this way, the workers for example, prioritise employment over the long term effects of the externalised costs. Trade unions do not see environmental struggles as falling within their terms of operation and hence tend to overlook these struggles. The state is seen to be preoccupied with the need for creating an enabling environment for investors. They prioritise that at the expense of the lives of many people in Kankoyo. Community organisations have also been unable to effectively respond to these challenges

Chapter six is the conclusion and discussion. It summaries and discusses the findings and literature contained in this report. It highlights the key issues arising from the research in line with the research question and objective. The chapter ends with the recommendations which provide the suggested way forward to the environmental crisis in Kankoyo Township and the Copperbelt region in general.

2 Literature Review: Mining, Development and the Environment

2.1 Introduction

The spectacular growth of copper mining in Zambia brought about heightened expectations of modernisation and a better life for all. However, the economic failures arising from mining extraction has dampened the hopes for many people brining about a wide range of meanings and interpretations of development. On the other hand, while the people and the state became entangled in their expectations of a better life, the environment was overlooked. It thus became the biggest victim of the battle between people's expectations and the benefits arising from mining. This chapter presents a vivid account of these expectations and impacts of mining investment.

The chapter begins with the theoretical framework within which the relationship between mining and the environment is to be understood. It then presents development from the point of view of the experts and describes Zambia's experience with mineral resource led development. Development from the view of researchers and people affected follows. The chapter then locates the environment within the capitalist system and the relationship between mining and the environment is then discussed. The relationship between privatisation and the environment is then presented. Then it describes government responses to foreign direct investment in comparative terms. To this follows a discussion of the relationship between mining and the environment on the copperbelt, and housing in the mine townships from a comparative perspective. The chapter concludes with a discussion on social recognition of environmental costs generally.

2.2 Theoretical approach

In order to understand the social issues surrounding mining, the theoretical approach must focus first, on how the physical processes of mining affect human bodies, the environment and housing etc. Second, it must address the ways in which communities affected by mining, trade unions/civil society organisations and the state express their concerns on issues around externalised costs of mining. Do they for instance frame their concerns as issues of social and environmental justice (Cock, 2007; Madihlaba, 2004), the preservation of cultural integrity and/or indigenous rights (Kangwa et al., 2008), or claims to be included in decisions about mineral development (Negi, 2013)? More specifically, what is their ideological position, understanding and definitions e.g. do they see mineral extraction as a process of economic development that produces social and environmental side effects that can be mitigated (Economic growth and Institutionalist perspectives) (Clapp & Dauvergne, 2008)? Or do they advocate for a change of the entire economic system (Social greens) (Foster, 2001; Sachs, 1999) or are they in between (Bio-environmentalists) (Clapp & Dauvergne, 2008), or is it anything different?

Therefore, due to the complexity of the relationship between mining, environment and people and the economy, the most appropriate approach for this study is the multi-dimensional eco-Marxist perspective (Pillay, 2013). This analysis uses a combination of the economic, ecologic and social issues as the lens through which the crises brought by industrialisation can be understood. In this way, it encourages a holistic perspective and hence provides a deeper analysis for understanding the environmental problems that the people of Kankoyo Township face. It also provides opportunities for environmental groups, trade unions, communities and the state to see the interconnections between environmental issues and capitalism as an economic system. This approach is thus important for this study as (Pillay, 2013, p. 152) argues because it not only fits well in the current ecological debate but also because, it proposes a fundamental change to the social relations of production if sustainable human development is to occur. For this reason, the next section focuses on development and broader economic issues around mining.

2.3 Development: Expert view

Development in the words of Peet and Hartwick means making a better life for everyone i.e. essentially meeting basic needs such as sufficient food to maintain good health, a safe, healthy place in which to live, affordable services available to everyone and being treated with dignity and respect (Peet & Hartwick, 2009, p. 1). It is therefore not surprising that there is a wide spread tendency to associate something positive and desirable with the word 'development' (Martinussen, 1997, p. 34). Since the 1950s it was assumed that growth and modernisation i.e. greater similarity with the developed countries would bring development to Africa and Latin America. From 1970s, the dominant growth model has been 'economic development' which is defined as a "process whereby the real per capita income of a country increases over a long period of time while simultaneously poverty is reduced and the inequality in society is generally diminished or at least not increased" (Martinussen, 1997, p. 37). These ideas are based on western economic theory.

Traditional western economic theory has argued that export growth should serve as an engine of development, stimulating the spread of modern productive activities to the country side through a multiplier effect (Seidman, 1979, p. 37). These ideas find expression among the new and previous investors in Zambia. Recently, talking about mining investment in Lumwana, Tassell (2008) said that:

> "It is not only bringing massive investment, but jobs, expertise, and opportunities for Zambia [and will] transform the economy of North-western Province, kick start growth and bring a measure of prosperity to areas which would otherwise have little prospect of ever escaping from poverty" (cited in Negi, 2014, p. 1007).

In line with the above, the policy approach promoted by International Financial Institutions (IFIs) for developing countries with significant resource endowments is one that sees foreign direct investment in the mineral sector as a key that will unlock the country's buried treasure and set in motion a virtuous cycle of socioeconomic change (Bush, 2010; Negi, 2011).

Bridge (2004) explains that this treasure chest theory of resource-based economic development is widespread and gains its justification from a remarkably diverse array of intellectual traditions which include: (*a*) the theory of comparative advantage which encourages countries with large natural resource endowments to specialize in extracting and exporting minerals and use the wealth generated to import other goods and services; (*b*) theories of resource-based industrialization such as import substitution (see also Adam & Simpasa, 2010; Cooper, 2002; Young & Turner, 1984) which seek to develop indigenous natural resources and downstream processing capacity as a way to reduce dependency on imports and provide the basis for domestic industrialization; (*c*) geopolitical theories about national security and state-led strategies of resource acquisition in order to stave off resource famines and ensure the availability of strategically significant minerals; and (*d*) growth pole theories that view mining investment as a form of pump priming to address uneven patterns of economic development.

Since the mid-1980s, emphasis has been on the withdrawal of state and back to the market through neoliberal privatisation and trade liberalisation policies (Mbembe, 2001; Peet, 2009; Stiglitz, 2003). These policies stress foreign direct investment in the mineral sector as a means of generating foreign exchange earnings, enhancing state revenues, and upgrading professional and technical skills. These policies have had a significant influence in developing countries in ways that have been destructive to the environment.

2.3.1 Pro FDI-Anti environment Policy shifts in developing Countries

The belief that attracting FDI will lead to economic development has led many countries in the global South to change their policies to meet this objective. The only problem is that in many instances, the policies do not take into consideration the environmental impacts that come along with the increase in FDI. It is in this line that Boron (2015) argues that "if indeed the state plays a more active role and gives extractivism a greater legitimacy it is because it redistributes some of the surplus to the population, but it still repeats the negative environmental and social impacts of old extractivism" (p. 2).

He writes that Venezuela is intensifying petroleum exploration, Bolivia with iron, lithium, oil, gas and mercury. Ecuador is going ahead with exploitation of petroleum and open pit mining. Uruguay is endorsing a huge program of exploitation of iron ore, and Botnia pulp mill. Argentina is protecting open pit mining allowing the destruction of glaciers. While Brazil is allowing the deforestation of the Amazon and promoting the construction of huge dams that will end up destroying the vital oxygen producing lungs of planet Earth (Boron, 2015, p. 2).

In this connection, during Zambia's privatisation, in order to attract investments in the mines, the trade agreements signed exempted the new companies from taking responsibility of environmental liability e.g. a dam to store toxic 'leaching' or a slag heap that the new company did not think could be of use to them. These agreements also exempted the new companies from taking responsibility for cleanups for past pollution (Fraser & Lungu, 2007; Simutanyi, 2008). Fraser & Lungu (2007) argues that it is on this basis that the new mining companies are now able to deny responsibility for their own pollution claiming that it is historic (p. 16). Haglund (2008) argues that inadequate regulation of the mining sector allowed a situation in which mining companies could close at will and without notice. In the process they left behind socio-economic and environmental impacts without knowing who would take responsibility. This implied long term environmental burden on government and risk exposure for the local people living in the mine Townships.

In addition, attracting foreign investment has led to the provision of favorable tax regimes, concessions and long stability periods, exemptions from tariffs and customs duties and free transfer of profits (Boron, 2015; Bush, 2010; Fraser & Lungu, 2007; Haglund, 2008). It is therefore, clear that investments in mining and expansion are supported by weak environmental controls, relaxed labour laws and increased government rhetoric that publicize the benefit of these policies. Yet there has been a failure to quantify the immense environmental costs (i.e. pollution, degradation of arable land etc.) arising from that increased growth and expansion.

2.3.2 Neoliberalism, Privatisation and the environment

The privatization of Zambia Consolidated Copper Mines (ZCCM) sought to achieve two financial goals. The first was to stem the operating losses that were borne by the public budget and that were crowding out already low public expenditure. The second was to reverse the 30-year trend of underinvestment in exploration and production, which, in large measure, was responsible for the losses (Adam & Simpasa, 2010, p. 68). The writers argue that, it was anticipated that, with sufficient investment, the mines would return to profitability and remain viable at expected long-run prices, generating public revenue directly through mineral taxation and indirectly through the local multiplier. However, for the workers and the environment, it left disastrous consequences. For the environment it meant relaxation of the environmental laws in order to reduce costs for the mining companies. The legal protection necessary to safeguard the environment and hence the lives of the people living in the nearby Townships were removed (Fraser & Lungu, 2007; Simutanyi, 2008).

For labour it meant the contraction of the workforce, growth of unemployment and the informal sector (Mbembe, 2001; Standing, 2011). Mbembe argues that if a neoliberal way out of a crisis has so far led to any renewal of growth, it is growth with unemployment. Regular, protected wage employment has not totally disappeared, but the proportion of individuals in such jobs has been falling consistently. Casual work, open and disguised unemployment, joblessness, formerly permanent workers taken back on low wages, graduate without jobs, and increased competition on an informal labour market with precarious jobs is the new order of the day (Mbembe, 2001, p. 55). This has opened the way for a deepening mass poverty. The fear of falling into extreme poverty has led women and children to seek opportunities outside the legal framework such as illegal mining in the dumpsites left behind by formal mining operations (Mususa, Fraser, & Larmer, 2010, p. 185). Mususa et al (2010) note that small groups of women and children are commonly seen digging and sorting out flux stone and copper ore with only the support of sieves, picks, hoes, and shovels" (p. 2). Yet this job has led to many complaints of respiratory problems caused by the residual dust (Mususa et al., 2010, p. 197). In this way privatisation has increased the vulnerability to environmental costs of mining. As a result of these many researchers and ordinary Zambians now critique mineral led development in Zambia.

2.4 Mineral Resource led development in Zambia: Economic critique

Copper mining accounts for over 80 per cent of export earnings and its contribution to Zambian GDP stands at 12 per cent (ICMM, 2014, p. 6). The belief in mineral resource development can be summarised in the following terms.

> "one clear lesson of Zambia's experience is that, if a developing country has established friendly relations with a foreign mining house, that is expanding production steadily, efficiently and profitably, and thereby providing employment, taxes and export revenues, it would be well advised to foster rather than to jeopardise this relationship" (Cunningham, 1981, p. 294).

Following privatisation an excess of US$8 billion foreign direct investment has been invested in the mining sector in Zambia. By 2013, foreign private capital inflows to Zambia grew by 29.4 percent to US $2,470.9 million from US $1,909.4 million recorded in 2012 mainly in mining (GRZ, 2015). Annual finished production has risen from a low of 257,000 metric tonnes per annum to over 763,805 metric tonnes in 2013 and predicted to rise to over 1.5 million metric tonnes within 5–10 years (ICMM, 2014). Yet By 2014 Zambia was one of the least developed countries in Africa, ranking 164 out of 187 countries on the Human Development Index (HDI). Almost two-thirds of the people live below the international poverty line. The country's Gini coefficient (a measure of inequality) is one of the highest in Africa (ICMM, 2014, p. 4). As at end-August 2015 external debt was US $6.3 billion and domestic debt of K26.5 billion. In rural areas, access to clean and safe drinking water stood 67 percent and access to sanitation at 44 percent. In the urban access to clean and safe drinking water was at 87 percent. Access to improved sanitation was at 57 percent (National Budget, 2016).

2.5 Development: What the affected people think: disappointment or exaggeration?

Zambia has since the inception of mining been a research laboratory for many researchers seeking to understand mining and development in Africa. In the process a huge body of literature exists that reveals the entanglements, conflicts and parallels about mining capitalism in Zambia. The famous critique has been that mineral resource development is a myth (Ferguson, 1999; Mususa, 2012). The second is that it is an ambivalent system based on inequalities (Fraser & Lungu, 2007; Frederiksen, 2010; Negi, 2014). Thirdly, it is argued that it is a system based on the capitalist price crises 'the boom and busts' (Adam & Simpasa, 2010; Fraser, 2010). It leads to weakening of trade unions (Bates, 1971; Burawoy, 1972; Larmer, 2007; Lee, 2009; Negi, 2011; Parpart, 1983). It is a system that has promoted gender inequality as women were integrated as supports of men rather than as wage earners (Parpart, 1986).

2.5.1 Development as Myth

Between 1930 and 1964 Northern Rhodesia was transformed from a colonial 'backwater' into a key asset of the British Empire and one of the world's largest exporters of copper (Parpart, 1983). Ferguson narrates how in the mid-1960s, everyone knew that independent Zambia was one of the fastest and emerging middle income economies. The country had "a vibrant industrial economy that made it one of the richest and most promising of the new African states" (Ferguson, 1999, p. 2). The mining towns that had sprung up on the Copperbelt symbolized newness of a western-style industrial modernity (Ferguson, 1999, p. 5). However, following the more than two decades of steep economic decline between 1974 and 1994 'the African Industrial Revolution' slipped of the track as Zambia's economy tumbled in line with the copper and oil crises. Consequently, by 1991, about 68 percent of Zambians were living in households with expenditures below a level sufficient to provide "basic needs," and 55 percent did not have sufficient income even to meet basic nutritional needs (Ferguson, 1999, p. 6). Based on this reversal of the myth of modernisation, he concluded that modernization is a myth in the sense that it is a false or factually inaccurate version of things that has come to be widely believed.

Following in this in line Mususa (2012) examines life after privatisation in Luanshya, which is one the previously urbanised town on Zambia's copperbelt. She argues that the withdrawal of the mines from welfare provision following privatisation has radically altered people's well-being, and the character of the urban areas. According to Mususa, formerly urbanised towns like Luanshya have now become like 'villages'. She argues that the deteriorating conditions of life on the copperbelt could possibly account for changes in population as people move to other places such as Lusaka and rural areas in search of new opportunities (Mususa, 2012, p. 571). She concludes like (Ferguson, 1999), that these changes have laid bare the fallacy of the idea of the urban as modern, which the former neat facade of the Copperbelt towns could elude (Mususa, 2012, p. 572).

2.5.2 Development: an ambivalent system of inequality, winners and losers

Frederiksen (2010) argues that from inception, as wealth poured from the Copperbelt it left little mark on the rest of the country, only a residue of inequality. The modernity, progress, wealth and transformation of the Copperbelt were surrounded by deprivation, widespread poverty, famine and disease, with infant mortality around 30%. The conditions of life for most Zambians had deteriorated in the first decades since British rule was declared in the 1890s (p. 18). Nationalisation tried to address these inequalities by moderating wage increases for mine workers. The government tried to spread development across the country (Burawoy, 1972; Larmer, 2007). But the economic crisis between 1974 and 1994 prevented the attainment of that objective (Ferguson, 1999). In recent years following the privatisation and the subsequent boom in 2000s, a few people have benefited leaving the majority in poverty. With the boom, contracts were made for a few Zambians, others benefitted through corruption and others through rent seeking activities (Haglund, 2008). This has created a situation in which only a few benefit. Fraser & Lungu (2007) calls this few privileged category as those 'for whom the wind falls' in a neoliberal game of winners and losers.

In this way, the new mining investments in North western province have revealed the contradictory understandings of the mining boom. This is when ideas of the coming prosperity triggered by the materialisation of investment coincide with anxieties about increasing urban chaos and the supposed disruption of social–spatial 'order', and memories of previous economic busts (Negi, 2014, p. 1000). This reveals the ambivalent nature of mineral resource led development. In addition, the recognition by mining companies that certain jobs be reserved only for the local people has brought tensions and accusation of tribalism from people from other regions. This case raises crucial questions related to the appropriate scale of the redistribution of benefits from resources. "Will all Zambians have an equal stake, or should those 'indigenous' to mining reserves enjoy privileged access" (Negi, 2013, p. 246)? In this way, mineral resource development continues to move along the lines of inequality.

2.5.3 Development as labour weakening

Several studies in Zambia have shown that mining investment and the need to spread economic benefits to the rest of the country has led to a severe weakening of the labour movement (Bates, 1971; Burawoy, 1972; Larmer, 2007; Lee, 2009; Mwendapole, 1977; Parpart, 1983). A few examples suffice. Bates (1971) analysed the linkages between the Mineworkers' Union and the United National Independence Party (UNIP) and explored the relevance of these linkages to a more sophisticated understanding of political development. His focus was on what factors determine the degree to which labour policies in developing nations succeed or fail?" (p. 3). In addition he examined the nature of trade unions in Zambia and concluded like others that labour unions in Zambia have been transformed into agencies for increasing the productivity of the workforce. This conception of the role of labour represents a shift of the elites from the militant actions of the unions prior to independence. Mwendapole (1977) adds that bitter infighting between trade union leaders of the successive trade unions was another factor contributing to labour weakening. While acknowledging trade union weaknesses, Lee (2009) shows some optimism in the strength of the Zambian labour movement through their success in halting casualization and the signing of trade unions collective agreements in 2007 at the Chinese owned copper mine (pp.127)

In recent years, Negi (2011), Fraser & Lungu (2007) and many others, have argued that the interlinked processes of structural adjustment and the privatization of the mines has significantly weakened the country's historically strong labour unions. Trade unions still remain relevant political actors within the workplace. But they are less salient in the arena of the broader civil society. Instead, loose networks of assorted groups have coalesced around the issue of capital's developmental impacts, namely the mechanism of Corporate Social Responsibility. This has now become a pivotal site of the emergent politics of mining. CSR has thus become an important threat to the relevance of the labour movement (Negi, 2011). The other critique has been in relation to mining, gender and class inequality.

2.5.4 Mining: Class and gender

Parpart (1986) explains that at the beginning of mining operations women were not allowed in the mining Townships. The new mining companies put in place regulation that restricted women in the mines which was the only source of employment apart from farming at the time. Even if women were later allowed in the mine Townships, their role was restricted to supporting their husbands (the miner worker) in an effort to stabilise labour. As a result women were integrated in the capitalist system in Zambia not as wage earners or entrepreneurs but as a subordinate group to support the interest of capital. This follows the historical argument that men have over the years developed weapons to assert male dominance and to denigrate and restrict women to passive and subordinate roles (Banner et al., 1971).

The end result is a situation in which women are more or less effectively excluded from access to the vital economic resources and political positions of their society. These experiences have also been noted in other countries. For example, Bujra (1977) notes in Kenya's Atu village that he examined, that "in formal sense women in Atu are mere chattels and dependents of men and men accordingly speak of them in manner of contemptuous dismissal. Only men know what is right and sensible" (Bujra, 1977, p. 14). This view therefore holds that mining activities in Zambia are in part responsible for gender and class inequalities. Therefore, this study also examines the extent to which this class and gender inequalities find expression in the community experiences with the environmental costs of mining.

The above critique is important in understanding development. Yet it does not tell the whole story about mining in Zambia. This is because it overlooks the relationship between mining development and the environment and more specifically, the voices of the affected communities.

2.6 The Environmental perspectives

Nature or the environment refers to natural resources, minerals, land, oil and gas, biogas, biofuels, water, air etc. found in the earth. In recent years the environment has gained top position on the global political agenda because of capitalism's heavy reliance on nature for natural resources (Agenda 2030). Altvater (2006) posits that "at the centre of the analysis of capitalism's relation to nature is the inherent and unavoidable dependence on natural resources (p. 39). Critiques have argued that for many years, capitalism has treated nature as an infinite reservoir of natural resources to be exploited for raw materials and energy sources. Nature has been seen as a bottomless sink capable of absorbing unlimited industrial and consumer waste (Cock, 2007; Harvey, 2014; Magdoff & Foster, 2011; Williams, 2014).

They warn that this has led to the exploitation of natural resources and the contamination of the earth through pollution, and waste arising from consumption and production. Applied to mining, the extraction of minerals is referred to as extractivism. Extractivism broadly describes activities which remove great quantities of natural resources that are not then processed (or done so in a limited fashion) and that leave a country as exports (Gudynas in Boron, 2015, p. 2). The major challenge however, is that while mining is the main stay of Zambia's economy it is inherently polluting to the environment.

2.6.1 Mining: an inherent pollution

Pollution according to the Environmental Management Act of the laws of Zambia means:

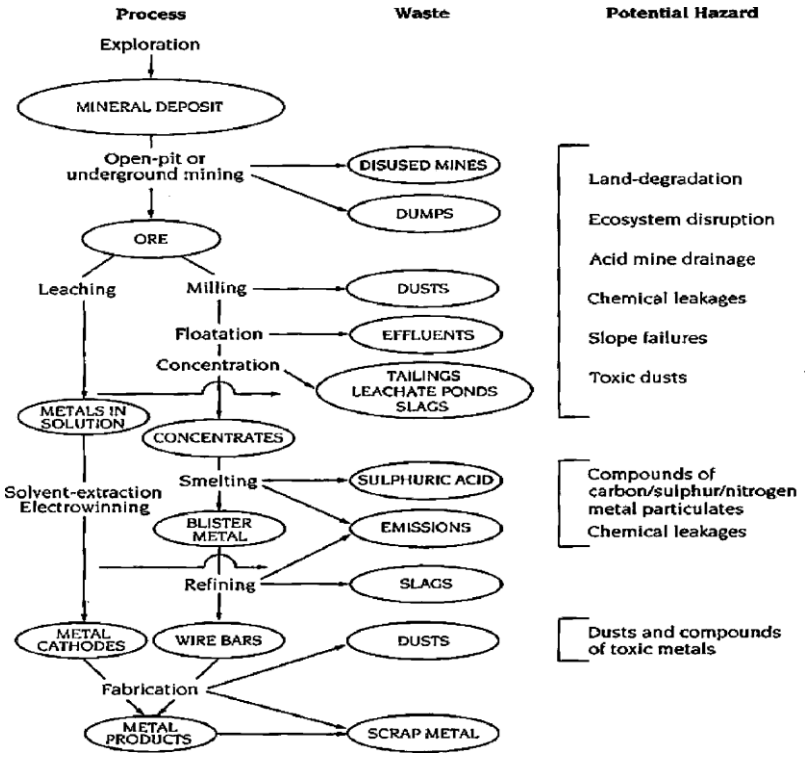
> "the presence in the environment of one or more contaminants or pollutants in such quantities and under such conditions as may cause discomfort to, or endanger, the health, safety and welfare of human beings, or which may cause injury or damage to plant or animal life or property, or which may interfere unreasonably with the normal enjoyment of life, the use of property or conduct of business (EMA, 2011).

According to Bridge (2004) mining is inherently physically and chemically polluting to the environment. Physical pollution results from the ingress of particulates into the atmosphere, (as dust and aerosols) into water, or onto land. Simukanga (1999) explains that sulphur dioxide from the Zambian mines results from the roasting and refining of copper bearing sulphide ores. The principal ore is chalcopyrite (CuFeS2) and the first stage in most processes is roasting or smelting the ore in air, which oxidises some of the copper and produces sulphur dioxide. Water pollution happens at two levels: the first is due to the injection of sulphuric acid solution into the ground to dissolve the copper ore directly in the deposit (Balance, 2010). The second arises from heavy metal effluents discharged into rivers (Fraser & Lungu, 2007, p. 33).

Bridge (2004, 210) explains that the salient characteristic of metal mining is that mineral processing is a *segregative process* by which a relatively small amount of a valued substance is isolated from a much larger mass of less valuable material. Segregating the valued component occurs through a series of steps, each producing a separate waste stream. He explains that over 99.5% of the material mined to produce copper, is rejected as waste during processing. He explains for example, that the average Canadian metal mine rejects 42% of the mined material immediately as waste rock, a further 52% from the mill as tailings, and an additional 4% from the smelter as slag: The remaining 2% comprises the values for which ore is mined.

In South Africa Madihlaba (2004) argues that the mining industry is the largest single producer of waste accounting for almost two thirds of the total waste stream. This has had an indirect impact on a wide range of land, air and water resources. For every ton of metal that leaves the mills, 100 tons of waste is created. This waste is normally deposited into the mine tailings dump many of which are located near the black communities causing hazards for the residents and communities. Apart from the unsightly mountains left behind by the legacy of mining there is also water contamination, salination, and siltation and air pollution (p. 158). Bridge (2004) adds that the challenge of waste disposal is not restricted to metal mines. The extraction and processing of phosphates, for example, requires separating phosphate from a matrix of sand and clay: Clay wastes (known as slimes) constitute over half the total plant waste and require large settling ponds for disposal. The figure below illustrates these processes, waste produced and the potential hazards.

1Mining Processes and waste production



Adopted from Bridge 2004, 211

Bridge (2004) explains that waste volume is frequently only part of the problem as waste streams are often chemically reactive. Overburden and waste rock may be the most significant waste streams by weight, but they are not necessarily the most contaminating because the concentration of contaminants in waste typically increases with the degree of processing. Studies of waste streams from copper processing in the Clark Fork River basin of Montana, for example, demonstrate how arsenic concentrations increase from 1070 ppm for heap-roasting slags to 2960 ppm in mill tailings and 10,400 ppm in smelter residues (for comparison, background arsenic concentrations are 10 ppm). He explains that these studies point to tailings ponds as one of the primary contamination sources associated with metal extraction because the concentration of potential pollutants, such as arsenic, cadmium, copper, lead, and zinc, is significantly higher in tailings than in waste rock.

2.6.1.1 Chemical pollution

Chemical pollution can occur by the release to the environment of reagents added during mineral processing. It can also happen by oxidation of naturally occurring minerals in the ore as a result of exposure to air. Pollution from chemicals (e.g., sulfuric acid for the leaching of copper oxides and mercury or cyanide for the extraction of gold) is due to chemicals used in mineral processing that can escape into the environment (Bridge 2004, 213). He explains that in terms of oxidation the primary challenge arises from sulfide deposits. Many metal ores (nickel, copper, and lead, for example) occur as sulfides, and in the presence of oxygen and water, these oxidize to form sulfuric acid. The oxidation of sulfide ores can generate acid rock drainage (ARD) if it is not effectively managed. He concludes that ARD is arguably the most serious environmental problem facing the mining industry and the industry's largest environmental liability.

2.6.2 Environmental costs: Effects

The environmental effects of mining are wide ranging as they affect not only the local environment but also other ecosystems. The major component of the dust and air pollution is Sulphur dioxide. The major problem with sulphur dioxide is that: (a) excess sulphur dioxide emissions from smelting causes respiratory, skin, eyes and other diseases not yet known (Fraser & Lungu, 2007, p. 33); (b) as Bridge (2004) explains, it leads to the formation of acid rain, which is detrimental to vegetation growth and soil fertility; (c) it leads to erosion of infrastructure. As a consequence in Kankoyo Township, there is very little vegetation growth, while the walls of the houses are stained and the paint peels off (Balance, 2010; Fraser & Lungu, 2007; Lindahl, 2014b; Nakana, 2013); (d) mining also lead to the physical landscape modifications that occur in the process of extracting and refining valued materials from the earth (Douglas & Lawson, 2002; Flows, 1997), displacement of people and deprivation of land uses in terms of agriculture, housing and for wildlife use (Kangwa et al., 2008; Lindahl, 2014);

(e) In addition to causing direct effects on health, pollution from mining operations has contaminated the land. Large tracts of fertile agricultural land have been contaminated by polychlorinated biphenyls (PCBs) discharged from electrical transformers used in mining operations (Nakana, 2013); and (f) water pollution caused by mining has devastating effect on the flora and fauna which are already threatened by many years of industrial development globally. In addition water pollution causes a lot of discomfort to the people in terms of abdominal pains, diarrhoea and other diseases of the skin, eyes etc. From the economic perspective mining waste increases the costs for the water supply company on water treatment (Lungu & Mulenga, 2005, p. 84).

From the ecosystems perspective, the effects of mining wastes in the environment are considered in three areas: (*a*) the effects of air and water emissions and solid wastes on the biological productivity of receiving ecosystems [e.g., the effect of mine tailings on rates of primary productivity or the availability of spawning sites in aquatic ecosystems ; (*b*) the contribution of mining to biogeochemical processes that are regional or global in scope (e.g., the effects of coal combustion or energy use in mining on the global carbon cycle, the contribution of smelting to the sulphur cycle, or the impact of mining and smelting on the global flux of trace metals, such as copper, arsenic, and mercury);

and (*c*) the role of mining in driving regional land-cover conversion, habitat fragmentation, and associated effects on biodiversity (Bridge, 2004, p. 215).

Generally, environmental impacts of mining affect water, air pollution and dust, siltation and sedimentation (Lindahl, 2014, p. 3)**.** Of these, dust has been responsible for extremely large numbers of respiratory diseases, particularly silicosis and tuberculosis. Accordingly, the prevalence of pulmonary tuberculosis (PTB) among residents of the Copperbelt region was 1,693 per 100,000 inhabitants, a rate twice that among Zambia's general population. Among mineworkers, rates were even higher at 5,262 per 100,000 (Nakana, 2013, p. 166).

2.6.3 Mining and the environment on the Copperbelt: Context

The long standing dumpsites in Kitwe, Luanshya, Ndola, Solwezi and abandoned mines such as the Kabwe lead, and the environmental degradation seen in various mine Townships on the copperbelt are the constant reminder of this historical environmental neglect. In addition, massive tailings dumps and leaching dams mark the landscape of the Copperbelt. Many residents who have been born on the copperbelt and who don't understand the environmental impacts of these dams see them as the 'pride of the copperbelt' a symbol of a country's wealth. However, when eroded by heavy seasonal rains these structures lead to toxic run-off that floods local farmland, and weakening of the bases of dumps and dam walls (Fraser & Lungu, 2007, p. 34).

However, while environmental problems can be traced to the ZCCM era, the privatisation 'Development Agreements' have weakened environmental policing ability (Fraser & Lungu, 2007, p. 34). Lindahl, (2014, p. 3) further argues that the contribution to environmental degradation from old mining legacy have shown to be minor compared to the post-privatization period. The following section addresses the two main forms of pollution that people in the affected areas have to face in their daily lives: air and water pollution.

2.6.3.1 Air pollution

Mining activities in the form of smelters, refineries, and quarrying account for the highest emissions and pollution in Zambia. The main pollutants include sulphur dioxide (SO2), oxides of nitrogen (NOx), particulate matter, carbon monoxide (CO), dust, Carbon dioxide, offensive odours and black smoke (Balance, 2010; Chipatu, 2011; Lindahl, 2014). Simukanga (1999) argues that the exposure to sulphur dioxide in Zambia is an on-going environmental problem and its sources goes beyond mining. Nitrogen Chemicals of Zambia (NCZ) in Kafue produces Sulphuric acid for use in the manufacture of fertilisers and also results in sulphur dioxide emissions. Added to this exposure is Sulphur dioxide production that results from the combustion of fossil fuels (petroleum and coal), and from motor vehicles.

Simukanga (1999) argues that according to the Environmental Report (1990), Sulphur dioxide levels were as high as 90-100 tonnes/day at Nkana mine and 460 tonnes/day and Mufulira mine respectively. He argues that, there were no in-stack emissions monitoring unit at all sulphur-emitting operations in Nkana and Mufulira and that monitoring was based on metallurgical balances. In 1997, the total sulphur emissions for Nkana mine operations were about 50,000 tonnes which was about 45% emissions. Mufulira mine emits about 60,000 tonnes of sulphur per annum (Simukanga, 1999).

2.6.3.2 Water pollution

According to Kasapatu (2013) several studies done on water in the Kafue River on which water most people depend for domestic and agriculture water showed significant water pollution levels. Kasapatu (2013) argues that while copper mining still remains the backbone Zambia's economy, it is also among the largest contributors to water pollution. This happens through leaks from worn out pipes and sometimes negligent emissions in the environment (Fraser and Lungu, 2007; Kasapatu 2011). Pollution of water caused by copper mining makes the water unclean, unsafe and unhealthy. As a result it limits access to water for human use and hence a violation of the right to a clean, safe and healthy environment (p.66). Environmental accidents also contribute to water pollution on the copperbelt.

2.6.4 KCM pollution of Kafue River

Fraser & Lungu (2007) writes that on November 6, 2006, the entire Chingola district was faced with a water supply crisis following pollution of the Kafue River. This was caused by a spillage of mining effluents from the KCM tailings leach plant. The River turned blue and the chemical concentrations rose to 1,000% of acceptable levels of copper, 77,000% of manganese and 10,000% of cobalt. The residents of Chingola Township were cut off from supplies of freshwater for six days as a result. The writers warn that consuming water as polluted as that in the Kafue, eating fish from the river, or plants watered with polluted water is likely to have wide-ranging short-term and long-term health implications. Some of these chemicals are known to cause lung, heart, liver and kidney damage. In the short term, a large number of residents suffered from diarrhoea, eye infections and skin irritations. Exposure to manganese can cause 'manganism' a disease of the central nervous system affecting psychic and neurological functions. Brain damage effects in the local population may only show up in future generation (Fraser & Lungu, 2007, p. 36).

In 2011, the Lusaka High Court ordered Vedanta Resources and KCM to pay approximately $1.4m (£900,000) to 2,000 residents of Chingola. Vedanta later appealed against the judgment, denying responsibility for the pollution. Even though the verdict was upheld, the Supreme Court significantly reduced the compensation to people affected by the leakage (BBC, 2015). The villagers have joined forces to take their pollution claims to the High Court in London, where proceedings have been issued against Vedanta and Konkola Copper Mines KCM. So far Paralegals from a British law firm Leigh Day recently visited the copper belt to gather testimonies from 1,800 members of the community in Chingola mining town (BBC, 2015).

In addition, about 756 people were affected when there was a spill of acid from Mopani mine into the drinking water supply in 2008 (Lindahl, 2014). In December 2009, one of the trucks transporting sulphuric acid for Mopani overturned and its sulphuric acid spilled into Tukula Mutima River, a tributary of the Kafue River, the Copper belt's main water source. The fish immediately died and the plant life was burnt by the acidity (Balance, 2010). But the company claims that it has implemented an integrated water Management system and consolidates the discharge channels into the streams to effectively control and monitor pollution.

Nakana (2013) notes that another significant environmental disaster took place after Indian-owned Binani Industries decided to close Luanshya Copper Mines in 2003. The company stopped maintaining the tailings dam, and mine waste soon spilled over into the Luanshya River, a food and water source for large numbers of people in the Copperbelt. One more debilitating ecological disaster happened in January 2008 when acid waste from Chingola's mines reached the ground water of Mufulira Township, about 40 kilometres away. After this incident, about 800 inhabitants of the township began to complain of diarrhoea, abdominal pain, and vomiting. This describes the general situation on the copperbelt. But the following section looks at the housing situation in comparative terms with studies done in different countries.

2.7 Mining and housing: Comparative perspective

From the 1930s onwards, in order to address the problem of labour shortage, to stabilize the workforce near production sites, and to make it more productive, mining companies built housing estates and social infrastructure allowing them to take charge of, and control, the lives of the workers and their families (Cunningham, 1981; Klepper, 1979; Mwendapole, 1977; Parpart, 1986). This policy, which contributed to making these workers part of a relatively privileged social category, continued into the 1980s and was completely abandoned after privatisation. Even today, most of the workers still live in the mine Townships. New mining investment (Barrick Gold and First Quantum minerals) in North-western province have adopted this policy by building several housing units for employees inside and around the plant (Negi, 2011). Despite this approach being common in most mining companies in different countries, it has left severe environmental impacts on the workers.

At Witbank coal mine in South Africa, for example, living conditions in the hostels were generally poor. The cramped up conditions in the compounds were made worse by poor sanitation, diet and proximity to the mine compromised the workers' health conditions (Singer, 2010, p. 34). The employees were doubly exposed to what Nixon describes as 'environmental suffering' (Nixon, 2011) or 'environmental racism' (Bond, 2012), both at work and at home. These included coal based pollution such as smoke, dust and chemical fumes (Singer, 2010, p. 35).

From the Bolivian, and Ashton mine experiences the mine worker's experience with the environmental suffering starts from his place of work (Dennis, Henriques, & Slaughter, 1956; Nash, 1993). In certain incidences workers are exposed to environmental danger knowingly by their employers. Nyandu found loss of memory, headaches, aching joints and loss of sexual desire as some of the common complaints by workers for Thor chemicals a British company based in KwaZulu Natal in South Africa. Toxic mercury that the company was dealing in led to the death of some employees while others were badly affected (Nyandu, 2004, p. 289). In this sense mining subjects the miners to the 'very frontline' of environmental injustices as they 'arguably' bear the most direct and serious environmental impacts from mining (Madihlaba, 2004, p. 159). The unfortunate part is that in most cases the people affected by pollution fail to fully understand their situation as the following section shows.

2.8 Social recognition of environmental costs: Lessons from other places

A prodigious body of literature argues that the key factor in evaluating personal, social, and environmental problems is perceived risk (Slovic, 1987). Perceived risks strongly correlate with concern, agreement to support policies, and reactions to experts and other authorities (Lennart, 1997). Therefore, the balance of perceived risks with tangible benefits is one of the factors which drives overall risk perceptions and judgements of risk acceptability. In many instances people affected by the environment cost of capitalist production have an inability to relate their suffering to the cause. Therefore, social recognition refers to the (society) victims' ability to relate their environmental suffering to the cause (Cock, 2007).

Mazur (1991) explains that social recognition begins to happen only when people begin to make the connections between their place of residence and the existence of certain illnesses, between illness and toxic hazards, and between their individual problems and those of others (Auyero & Swistun, 2008, p. 7). The victims are not able to identify their illness to the cause due to a number of factors. Three main factors (the ubiquitous nature and invisibility of the pollutant, political and social factors and individualisation of the victims) account for this lack of knowledge.

a) Ubiquitous nature and invisibility of pollutants

Cock (2007) explains that sometimes people may fail to understand a risky environment because they are ubiquitous and invisible. This means that they exist everywhere and in anything in the environment, along with the absolute necessities of life such as the air, food clothing etc. She argues that the invisible, odorless, and tasteless pollutants that do not have an immediate impact on those they affect are difficulty to identify. They are only detectable and explicable by use of specialized scientific knowledge beyond the reach of the poor who suffer the consequences (Cock, 2007). This invisibility makes it difficult for people to notice the effect and later on attribute it to any particular cause. Nixon calls this 'slow violence', Galtung describe it as 'structural violence' while Beck calls it 'risky society' (Beck, 2000; Goltung, 1969). This is the damage that passes by ever so silently, unseen and well-hidden yet it is a violence of delayed destruction that is dispersed across time and space, an attritional violence that is not seen as violence at all (Nixon, 2011, p. 2). In addition is the invisibility of the damage to nature caused by newer risks such as nuclear or chemical contaminants, pollutants in foodstuffs, diseases of civilization etc. that escape human powers of direct perception.

This blinds people from noticing the impact of the pollution as the Flammable experience show. In the Argentine Township of Flammable "during the seventy-year period in which health-threatening pollution incubated in the neighbourhood, neither a major industrial accident nor a sudden discovery of a disease cluster ever disrupted daily routines" (Auyero & Swistun, 2008, p. 10). Uninterrupted routines and interactions thus work smoothly as blinders to increasing environmental hazards. This fits in with Gramscian concept of dual consciousness among the poor and exploited members of a capitalist society. To some extent they are taken in by attempts to legitimate the capitalist system but to some extent they also see through that system. They may accept the basic arrangement of capitalism such as wage labour, but nevertheless believe that the rich have too much power.

b) Social and political factors

Cock (2007) argues, sometimes it is not the case that the damage is invisible to direct sensory experience and understanding, but that it is deliberately concealed through deceit and denial by the polluters. The state and capitalist elites' opinions and claims about existing hazards shape the availability of information about the origins and effects of toxic contamination. These social relations of power influence what people should ignore, know, and misrecognize which in turn shapes locals' experiences of contamination and risk. In the end, poor people accept deadly subordination because of the differences in power relationships (Auyero and Swistun 2008). Thus, between the (contaminated) environment and the subjective experiences of it we find "cognitive frames that, deeply influenced by history and by discursive and practical interventions, shape toxic knowledge (or lack thereof)" (Auyero & Swistun, 2008, p. 11). The impact is that, the affected people remain divided, confused, and in certain cases ignorant about toxicity. This is because this ignorance was routinely reproduced and risks constantly normalized (Auyero & Swistun, 2008).

c) Individualism of cases

The individualism of the case to the affected individual happens when the law treats the subjects of pollution as individual incidences and not as interdependent cases. In this way, the law prevents the generalisation of the problems. Cock (2007) argues that this means that collective social recognition of the environmental costs of capitalist production is obstructed. In addition, the medical focus on individual diagnosis and treatment also fails to make the connections between individual cases and environmental conditions" (Cock, 2007, p. 125). It is usually only after decades of observation that a statistically significant correlation can be made between exposure to a chemical and effects in a large population" (Cock, 2007, p. unpaginated).

As a result, many victims of toxic waste suffer from 'latency invisibility', i.e. the long unknown period between contamination and disease as well as 'etiological invisibility' which means the difficulty of determining the causal pathway of disease (Cock, 2007, p. unpaginated). Unless a lot of people are affected, 'popular epidemiology' i.e. ability of the victims to detect a disease pattern, the illnesses are treated as individual and isolated incidences (ibid). The problem is that, this lack of secure knowledge makes it

difficult to make any clear judgment on how fatal environmental costs may be for the further continuous expansion of capital (Harvey, 2014).

2.9 Chapter summary

From the above discussions four themes clearly describe the relationship between mining, development and the environment.

a) Failure of the popular argument by politicians and IFIs that mining extraction will lead to economic and social development and a better life for all. Instead it has created more problems for people and dashed their expectations leading to a conclusion that development was just but a myth, ambivalent, has led to villagisation and has made tribalism more visible among the local people living in mining resource areas. In addition, the need to protect mining development has led to a severe weakening of the labour. As a result, mining development is seen as a 'development of labour weakening'. Consequently trade unions have now significantly lesser impact on politics outside the workplace such as environmental issues. Further, mining investments are also seen to have promoted class and gender inequalities.

b) While mining still remains the main stay of the Zambian economy, it is inherently devastating to the environment in two main ways: Physical pollution result from the ingress of particulates into the atmosphere (as dust and aerosols), in to water or onto land. Chemical pollution can occur by the release to the environment of reagents added during mineral processing and by oxidation of naturally occurring minerals in the ore as a result of exposure to air. The major sources of these environmental costs of mining are in the form of water, air and land pollution, disfigurement of the land, and deforestation among others. Sulphur dioxide is the main polluting agent among many others and poses a severe negative impact on the enjoyment of nature by the local people.

c) The chapter also show that the corporate policy on housing adopted by mining companies over the years has been disastrous to the workers. It is thus argued that it only served to increase the vulnerability and exposure of the working class communities to serious environmental danger. Therefore, while this corporate approach has since the 1930s helped to address the problem of labour shortage, to stabilize the workforce near production sites, and to make it more productive, and allowed mining companies take charge of, and control, the lives of the workers and their families it has created severe environmental problems for the workers.

d) The chapter provides evidence that starting from the colonial period through independence and nationalisation of the mines in late 1990s and early 2000 the environment has been overlooked. This is because the state and the general citizenry have concentrated on the economic benefits of mining and overlooking the environment impacts. This situation has been complicated by the implementation of neoliberal policies which have two main consequences: First because of the increase in unemployment due to retrenchment and declining job opportunities many people have resorted to informal employment. This increases their vulnerability to environmental suffering. Second in a bid to attract FDI, the government has been prepared to weaken environmental laws.

e) In the final part the literature review describes the different factors i.e. social, legal, medical, and political and other factors that influence the ways in which people understand the effects of environmental costs (pollution or industrial waste). While the experiences in this section are not directly related to mining, they provide a general understanding of people's ability to interpret environmental danger in their surroundings. The above literature provides an important basis for understanding the relationship between mining, development and the environment. But it still overlooks the environmental experiences of the affected workers in their own voice. This study fills that gap.

3 METHODOLOGY: Introduction

The study of mine workers understanding of environmental costs of mining in their communities required a qualitative approach in order to come up with rich data of the concerned subject's experiences. This methodology was employed to gather data that answers the questions: what is the mine workers understanding of the environmental costs of mining in the communities? How do they experience and cope with environment suffering? What are their individual collective responses? This chapter presents the research methodology employed in collecting data i.e. the approach, sampling methods, data collection procedures and the methods for analysing the data. (For the description of the study area see findings chapter).

3.1 Approach

My study employed a qualitative and explorative approach and all the data collected was analysed using the eco Marxist approach (see literature review). The qualitative approach was chosen due to the inductive nature of my study that required me to collect rich and detailed data on the Mopani mine workers understanding of the environmental costs of mining in the communities where they live. Qualitative research aims at exploring and understanding how reality appears to the research participants and reporting their feelings and experiences (Greenstein, Roberts, & Sitas, 2003; Neuman, 2006). Because qualitative research facilitates the collection of the type of data that allowed me to answer the research question, it was the most suited for my purpose.

3.2 Access

I gained access to my sample through the trade union, area councillor, church members and civil society. The manner in which I approached my respondents was in such a way that highlighted the benefits of the research in understanding the environmental impacts. I also explained how the derived information could be used for influencing policy and change from below. I explained that should this can lead to improved life for the affected people. The residents particularly youths were interested to participate in the study as a way of expressing their frustrations. Other participants initially thought I was in the area to recruit people for jobs. Others thought I was there to spy on behalf of either the government or the mine. The main concern of many participants was that while a lot of research had been conducted in the area before, there had been no

progress seen in the area. After my assurances I was welcomed and even offered meals and drinks during the long discussions we had. For many they had found an opportunity to express their feelings and frustrations.

3.3 Sampling

Participants in the study were chosen by use of purposive sampling initially, followed by the snow balling method. I used Purposive sampling to select my participants deliberately on the basis of possessing particular characteristics relevant to my research (Olgletree & Kawaluchi, 2012; A Strauss & Corbin, 1990). Purposive sampling was employed during focus groups and when interacting with the community to select unique participants for in depth investigation in the semi structured interviews. Snow balling was then used to select participants that were recommended by the key informants as well as participants in the focus groups. Snowballing involves identifying and selecting subjects and then asking them for names of other people who possess the same attributes in a network (Berg, 2001; Neuman, 2006).

The sample participants came from the basic unit of social reproduction of labour in the society of Kankoyo. The worker participants were either Mopani employees or contract workers employed by firms hired by Mopani and thus do Mopani work. The members of the community comprised of the retired, retrenched, wives of current or former employees, trade unions, civil society and state officials living and working in Kankoyo. This process was then followed by data collection which took place in two stages. The first process of data collection involved focus group discussions while the second was conducted using in-depth interviews.

3.4 Data collection

Triangulation reduces the risk of consistent misrepresentations in the use of only one method as "no single method is completely free from all possible validity threats" (Maxwell, 1998, p. 93). Therefore three data collection techniques were utilized: in depth semi-structured interviews, focus groups and participant observations. I started with focus group discussions the in-depth interviews while participant observation was employed throughout the study.

3.4.1 Focus group discussions

I started with focus groups for basically three reasons: firstly because of focus group's inherent strength in allowing for probing, identifying and exploring new themes that may arise during the interview (Legard, Regan, & Ward, 2003). Secondly focus groups produce a large amount of information far more quickly and at less cost than individual interviews. If used to explore simple issues, it does not need an experienced researcher to be effective (Greenstein et al., 2003). Thirdly, focus groups served as a method of selecting knowledgeable participants for the in-depth interviews that followed. I conducted a total of three focus groups comprising between five to eight respondents lasting on average 2 hours.

My first focus group was with the seven women who acted as key and initial informants about their understanding of environmental costs. This focus group was conducted at a broken pipe site where mothers drew water. They refused to find any other suitable place where we could sit as they insisted that we needed to see for ourselves (the researchers) how the women experienced environmental suffering and their lack of access to clean drinking water. This interview lasted for about 2 hours. This group was chosen because mothers experience environmental impacts more. Women are the ones involved in carrying out most of the basic chores such as drawing water, searching for charcoal, firewood, looking after sick etc. (Bond, 2012; Mosoetsa, 2011).

Secondly, the selected participants were those who have lived in the area for more than ten years. It was assumed that this group was knowledgeable enough to understand the problems of the area. Three of the research participants in this group had lived in the area for more than thirty years and have seen and experienced the problems of the area. Consequently these people were able to make comparisons between experiences under nationalised and privatised mine environments. Thirdly, my research required first-hand and rich information from the people who were directly affected by the environmental costs of mining in their own words, noting their feelings and expressions (Olgletree & Kawaluchi, 2012; Strauss & Corbin, 1990).

The second focus group involved Mopani mine workers who composed the main sources of information in this research. This group comprised nine participants who lived in Kankoyo and worked for Mopani. Those selected were those that had lived in the area for at least five to ten years and have worked for the company. These were chosen in order to get their understanding of the environmental costs on their communities as well as their experiences at work. Valuable and interesting information was provided by this group.

The third focus group involved the casual or contracted workers. These were employees that worked for companies contracted by Mopani but not directly employed by Mopani. These employees live in Kankoyo and experienced the same problems with Mopani employees living in the area. But they received more precarious treatment and lower wages and poor conditions of service. This group was chosen in order to understand how they understood environmental costs of mining. It also helped in describing how and their precarious work experiences affected their environmental suffering. The information gathered from this stage of the study was then used to inform the content of the semi structured interview schedule used in the second stage. Some of the participants from the focus group were then chosen and took part in the in-depth interviews that followed.

3.4.2 Semi structured interviews

Due to the limited nature of my research question and the limited time and space of my research project I opted for semi structured interviews as the primary method of data collection. Semi structured interviews allowed respondents to express themselves without restrictions. They also allowed for follow up questions in order to seek clarification on issues raised during the process of the interview. In-depth semi structured interviews also helped to take note of facial expressions and verbal language that expressed the respondents' feelings (Strauss & Corbin, 1990). These could have been missed if structured methods were used. A total of twenty one semi-structured interviews were therefore conducted broken down as follows: eight were Mopani employees, five were casual employee and four were mothers and residents of Kankoyo, one trade union official, area councillor, church and civil society.

My point was to explore as much as possible the data that spoke to my research question. My key questions in the semi-structured schedule were on health problems experienced if any, the social realisation of the link between the environmental costs and disease or environmental degradation, their coping mechanisms, experiences, what they saw or not see about pollution and why they still lived in that area.

3.4.3 Participant observation

Participant observation is "establishing a rapport, selecting informants, taking genealogies, transcribing texts, mapping fields – thick description" (Geertz, 1973, p. 6). Participant observation of the mine workers and residents of Kankoyo helped to immerse myself in the daily activities and operations of the subjects under study. This generated the in-depth and contextual information required to answer the project's research questions which could have otherwise escaped the focus group and interviews. Participant observation was chosen to assist in understanding the environment in which they live and they get by with a polluted environment. The process implied my involvement in peoples' lives for a period of time observing what happens and listening to what was said (Freidman & McDaniel, 1998). I spent a lot of time chatting and hanging out with some of the people who eventually became my friends. In the evenings I would go out in their usual places of socialisation such as bars and night clubs. This helped in understanding how people got by.

With participant observation research subjects' experiences are fundamental to understanding social action. This method helped in describing and explaining the actions and behaviours of the participants. Participatory observation was also important in establishing as Freidman & McDaniel (1998) note, the reliability and validity of interviews and focus group data. It thus helped in correlating what was said in the interview and focus groups proved. Thus observatory methods countered any social desirability in terms of responses and behaviours that may have occurred during the interviews and focus group discussions with with participants.

3.5 Data Analysis

Analysis of data is grounded within the eco Marxist tradition. This is because, from the eco Marxist perspective, it is impossible to understand the current ecological problems without looking at the social relations of production. The multi-dimensional eco-Marxists understand the crisis within the neoliberal system as a complex interaction between economic, ecologic and social crises arising from fossil fuel industrialisation (Pillay, 2013). (See introduction chapter). This approach helped in highlighting the interconnections between mining and the environment in Zambia. These relationships were important in explaining the social changes that have happened in the Zambian society.

In addition, reference to existing literature as can be shown in the literature review above was an important preliminary part of this process in establishing, the strengths, gaps and silences surrounding the environmental costs of production debate. The range of sources in this report is an attempt to show empirical information that speaks to this study. Therefore, this research was undertaken with certain assumptions about the contents and availability of relevant sources. In analysing the findings, a number of case studies were utilised as is shown in the literature review and discussion chapters. These case studies opened a clear debate, provided comparative insights and paved the way for a clearer research focus.

3.5.1 Ethics

This research was conducted within the standard guidelines of voluntary participation, ensuring participant safety, informed consent, anonymity and confidentiality (Babbie & Mouton, 2001; Olgletree & Kawaluchi, 2012). Therefore, I clearly communicated the methodology, purpose of the research as well as possible risks and benefits that could arise from the research. This was done in order that they were not deceived or coerced into participating in the study (Olgletree & Kawaluchi, 2012). In order to ensure data security, all electronic data from the interviews and focus groups stored on the computer was backed up on a memory stick and disc that was properly pass word and access protected. Hardcopy, handwritten, printed or transcript data was kept under lock and key and with limited access to other people. The same data will be kept at the

Sociology department at University of Witwatersrand after the study where only the supervisor and I will have access.

3.5.2 Limitations

My major concern for this study was time constraints for data collection because data was initially collected during the four week holiday. This was a very limited time to collect data given that in depth interviews and focus groups require more time, resources and effort to conduct. This was compounded by the fact that timing of meetings was dependent upon the availability of the respondent which was beyond my control. To overcome this July interviews were supplemented by another return to Zambia in September for further two weeks of interviews and focus group discussions. The follow up interviews were done between November 2015 and February 2016. Secondly, the fact that the research was conducted in Zambia meant that travel expenses and time lost during travel and rest all contributed to reducing the time available for research. To overcome these challenges I made advance contacts with my key informants in order to identify research participants before my arrival in Zambia. I also had to leave immediately after my exams so that I quickly started the process of data collection. The end result of this whole process was a successful experience of data collection that culminated in this research report.

4 Findings: Experience of environmental impacts of mining in Kankoyo, Introduction

This chapter investigates the various ways in which mine workers living in Kankoyo Township experience externalised costs of mining. It explores their coping mechanisms and what they think and feel about their polluted environment. More specifically, the chapter examines the views of this community regarding development. What development means to them and their expectations from the mining company and the state given that they live in an area in which copper is mined. The chapter begins with an understanding of mining investments in Kankoyo and then interrogates the various meanings attached to environmental danger. The roles of various stake holders (mining company, the state, trade unions and civil society) are also explored.

4.1 Mining investment in Mufulira

The period between 1929 and 1950 could be described as a time of discovery and expansion of Mufulira mine based in Kankoyo Township. This mining expansion was accompanied by growing expectations among the local people for employment, provision of social services and revenue for the government. For example, after 1954 mufulira mine had to guarantee 2 million pounds of a loan to the Rhodesia Congo border Power Corporation and to lend that corporation 0.75 million pounds. In 1956 the mine financed the construction of the Kariba dam which later supplied power to the mines and the governments of Northern Rhodesia and Nyasaland (Cunningham, 1981, pp. 105, 106). From that period up to the present, Mufulira mine has provided revenue in form of taxes and royalties to government, provision of housing and social services during the period of nationalisation (including the sponsorship of mufulira wanderers' football club). After privatisation the company has continued with payment of taxes and royalties and some corporate social responsibility activities.

At present Mopani Coppermine is one of the largest underground copper mines in Africa. MCM owns the mines at Nkana and Mufulira, both situated in the Copper belt. The Kankoyo based mine consists of an underground mine, a concentrator, a smelter, a refinery and an acid plant. It is also one of Zambia's important sources of employment for many people who live on the copperbelt. The total workforce in December 2014 stood at 20 718 out of which 9 343 were permanent while the remaining 11 375 were contractors (MUZ, 2015). By 2016 the Mine Workers Union of Zambia reported that

Mopani had 5493 permanent employees and 7494 contract employees. This brings the total number of employees to 12987 (MUZ, 2016).

Locally, the whole of Mufulira's economy relies on the mine and life there evolves almost completely around it. Apart from offering employment opportunities, the rest of the people depend on the mine for their livelihood in one way or the other. For example through contracts in the mine and other services linked to mine employees directly. In this sense the mine is so important to the economic survival of the people of Mufulira. But, because of its proximity to the houses (just about 20 to 50 meters from the nearest house), the over 3000 residents of Kankoyo Township have been victims of environmental costs of mining for many years. For the people of Kankoyo, the celebration for this mining development and growth is lost in their day to day struggles with a polluted environment. The presence of the mine in the area and the pollution it causes has given rise to different expectations, claims and meanings of development to the local people. It has led to the emergence of what appears to be 'a development of environmental suffering.

4.2 Development: Mining, expectations and claims

The people of Kankoyo Township have for a long time believed that mining investment will bring about an improved life for them. This can be evidenced by their day to day discussions. Firstly they bemoan the withdrawal of the provision of social services, housing, electricity, water and other free services previously offered by the company. Second, Kankoyo residents expect employment from the mines irrespective of their skill levels. This study found that most people strongly felt that the mines belonged to them were entitled to benefits from the mine. Not benefiting from the mines was thus seen as a form of injustice. A daughter of a former mine employee who had been arrested for illegally re-connecting water after failing to pay the water bills had this t say:

> "Why should we suffer like this when we have a very big mine, we live on top of copper. My dad like many others was arrested and detained in police cells because of an illegal connection of water. He was only released after paying ZMK 2000 which we got from the shylocks (local money lenders). So to pay this money we had to move out of the main house and into a small house outside

in the yard. Now all the rent from the main house goes to these money lenders" (Interview 4, Kankoyo, 2015).

Another respondent complained that:

> "It pains me to see trucks carrying loads of copper which brings millions of dollars for these mining companies. Yet the company cannot even provide electricity, water or even free education to the many orphaned children in Kankoyo. To me this is very unfair. The copper being produced in Zambia is building universities in countries like England, USA, and India. But look at the suffering here in Zambia" (Focusgroup 2, Kankoyo, 2015).

The people of Kankoyo strongly felt that the mining company could do more in the provision of social services and employment for the local people.

> "We live in an area which has a mine… we suffer from all sorts of pollution ranging from air, water, soils and dilapidated houses. Yet our children cannot even be employed…this is very unfair" (Focusgroup 1, Kankoyo, 2015).

Others expect some compensation.

> "You see for all the pollution that this company exposes us to, it would be fair if they could at least provide some of the services. For example, watering the area in order to settle the dust, provide clean water for free because all our water is polluted including the water that comes from the taps. Our soil is so contaminated that you cannot even grow vegetables. So provision of these services (kuti yachefyako ubwafya kubalanda ba muno mukankoyo) can lighten the burden on the poor people of Kankoyo" (Focusgroup 2, Kankoyo, 2015).

Comparisons were also expressed

> "Look at our friends in Solwezi, there the chief just put his foot down and said that all the unskilled jobs should be done by his people… and that they should also be trained for better jobs. But here, there is nobody to talk on our behalf. All the jobs that are supposed to be for our children have been taken by people

from Kitwe, Ndola and other places. Imagine that my child does not have a job but a person from Livingstone or even Solwezi has a job in the mines is that fair?" (Focusgroup 1, Kankoyo, 2015).

From all the discussions with the respondents, there was a general expression of disappointment with the government on its failure to deliver development.

> "Every President who comes in power says we will bring development to Kankoyo. Last time the Vice President was here and he said don't worry when you vote for us we will clean up the place, build a hospital and clinic. Immediately after the elections they leave…'bushe ni development 'yamusango shani iyakuchula nechusi, namenshi aya lamba, namayanda ayabola? (What kind of development is this where you are exposed to air and water pollution and rotten houses) this is development of environmental suffering…" (Interview 19, Kankoyo, 2015).

These expectations have further been complicated by the privatisation of the mines. During the privatization process, the government emphasized that selling the mines would lead to improved socio-economic improvements for many people. But, for the people of Kankoyo, the experiences of life after privatization have been a major disappointment.

> "During the time when government owned the mine we used to benefit through a lot of community initiatives and support. People used to get jobs but the situation is very bad. Most people in this area have lost their jobs. The few that work are employed by the contractors who pay them very little money not enough to meet the cost of living, school fees, water, electricity, food, refuse collection and the like" (Focusgroup 1, Kankoyo, 2015).

The situation was worse for widows:

> "My husband died of depression when he was retrenched from the mines in 2008. He had got a loan from the bank and when he was retrenched the bank got all the money and we remained with nothing. Within three months he died and I have had to live with these kids who can't go to school and can't get good

meals. Selling charcoal, sugarcane and vegetables are our main sources of income…but as you can see…that is just a hand to mouth business" (Focusgroup 1, Kankoyo, 2015).

On the basis of having a mine in their area, people of Kankoyo expect more from the mine and the government. Yet the outcome has proved to be different as their work and living environmental conditions show.

4.3 Environmental costs: Experiences in the work place

According to the mineworkers, the work environment underground was heavily polluted. It is very dark, hot and wet. This makes their work unpleasant and extremely difficult.

> "So we rely on the head lumps to talk to each other. There is poor ventilation and we go with our water bottles…even when you go with an ice block of water underground within two minutes the ice block turns into hot water" (Focusgroup 2, Kankoyo, 2015).

Dust is another problem that mine workers face in their daily experiences at work. This is worsened by blasting in the process of mineral extraction. In addition to this is the smell of chemicals from the explosives (Interview 9, Kankoyo, 2015). The wet conditions means that they get soaked immediately they reach their work place and continue up to the time they knock off. This has led some of the mine workers to liken their work place to conditions worsen than those found in prisons.

> "Working underground is like living in a prison…in fact a prison is even better… just think of this dark place where you can't even see your friend. Yet the place is at the same time dusty and noisy. On top of that there is no toilet underground so what kind of place is this? (Interview 17, Kankoyo, 2015).

This is how one of the workers described his daily experiences at work.

> "I am a machine man, when I am underground the pant I put on is not the one I put on when I am on surface. This is because within two days of buying one, the

elastic is weak. The water that is underground is full of chemicals that we can't even understand" (Focusgroup 2, Kankoyo, 2015).

As a result, miners have different attire for the underground work. According to these workers, in many instances when a miner dies their wives fail to recognise their bodies. This is due to the fact that the attire they put on underground make them unidentifiable.

> "we look and behave like mad men, tempers are very high and insults are the modes of communication… sometimes we fight with each other especially on targets…normality only returns when we get to the surface" (Focusgroup 2, Kankoyo, 2015).

The other problem is that there is always an inherent danger of accidents with rock falls being the most common. The miners explained that the pillars that they erect in the tunnels easily fall, making life underground very dangerous. The respondents explained that a number of miners have died due to rock falls. Because of the noise and darkness many miners have been crashed by the loaders because the drivers cannot see properly (Interview 12, Kankoyo, 2015). The environmental conditions underground are worsened by absence of conveniences such as toilets and clean drinking water. According to the respondents (both Mopani and contract workers) the fact that there are no toilet facilities underground implies that miners who want to help themselves will either do it just there where they are working or will simply pass urine in the uniforms as it makes no difference.

> "when you are underground and you feel like passing urine (ukuposa amenshi) you simply do it in the overall or work suit and nobody will know because the environment is wet" (Focusgroup 2, Kankoyo, 2015).

This exposure to a risky environment is complicated by the long hours of work spent underground. This was particularly a major complaint for the contract workers. For them their salary depends on meeting the set production targets. For these the low waged workers, a failure to meet targets means that life at home is negatively affected.

> "If you leave home at 4 pm or 5 pm and you go underground… you will come out of the mine at 03 AM in the morning. By the time you leave the mine it is 4

> AM. So we spend almost twelve hours per day. Sometimes you have no off for many months. If you don't meet the target 'tukoto' meaning very low wage" (Focusgroup 2, Kankoyo, 2015).

After realising that a number of employees (both Mopani and the contract) were reporting for work under influence of alcohol strict measures have been put in place. According to all the workers interviewed Mopani's policy on alcohol results in instant dismissal and loss of benefits. The miners acknowledged that it was not safe to work under the influence of alcohol as it led to a lot of accidents. But they argued that Mopani should have also considered why workers reported for work drunk (Focusgroup3, Kankoyo, 2015; Focusgroup 2, Kankoyo, 2015). According to most of the respondents the reason people reported for work under the influence of alcohol was because of the harsh environmental conditions at work. For the contractors the lower wages was the prominent cause of frustration. Alcohol was then used as a means of relieving the stress of long working hours and harsh environmental conditions. (Focusgroup 2, Kankoyo, 2015).

> "So when you are drunk you don't even report for work because of the fear of losing a job…it is better to lose part of a salary instead. Even the mine police would tell you before they even breathalyse you to go home when you are looking drunk" (Focusgroup3, Kankoyo, 2015).

The respondents (both categories of workers) argued that while Mopani has been putting up campaign messages for safety and they even say 'if it is not safe don't do it' in practice that does not work.

> "What normally happens is that a safety officer may come and tell your shift boss that this area is not safe and nobody should work here until it is made safe. But that order will not be followed. The shift boss will just wait for the safety officer to leave. Then he will come and tell you about your targets. If you refuse he will tell you to find somewhere else to report and not in his department" (Focusgroup3, Kankoyo, 2015).

This has created fear in the miners given the huge unemployment, poverty and scarcity of jobs. Miners are therefore left with no option but to work in environments that are not safe. Unfortunately, when an accident happens and a miner dies the company relies on the safety officers' report who said the area was not safe. This implies that in many instances the families of the deceased miners have lost out on compensation as the deceased is accused of negligence on duty (Focusgroup 2, Kankoyo, 2015). Despite this reality of life underground, many workers still remain very committed to their jobs. Those outside the workforce admire those in employment. If the workers in Mopani are being exploited, the unemployed wish to be exploited so that they can bring food on the table. As one of the contract employee commented:

> "ni sebana wikute" which means that never mind being embarrassed if only you can get a meal at the end of the day (Interview 3, Kankoyo, 2015).

Green and Justice, a grass root organisation working in Kankoyo observes that:

> "The job crisis in Zambia has killed a lot of people**.** You know we have no jobs in Zambia I can tell you that the working conditions are pathetic nowadays…you will not agree unless you go there" (Nkata, 2015).

One of the mineworkers added that:

> "But even if they allowed you (this researcher) to go underground, they will not take you where the actual production takes place… They will only allow you in places where there is better ventilation" (Focusgroup 2, Kankoyo, 2015).

A contract worker added further that:

> "Even if you manage to get where actual mining takes place…you will sweat before you even start the job…there is dust that cannot be controlled on these two mines Mufulira and Nkana…ventilation is inadequate. In the next ten to fifteen years I fear for the miners" (Focusgroup3, Kankoyo, 2015).

These responses reflect the view that there is a tendency by the mining company to conceal the environmental reality in the work place. Given that most workers are

unwilling to contest these harsh environmental realities in their work place it has been taken to be normal. According to Green Justice, the interest for the company is not to improve the conditions for the workers underground but to achieve increased production.

> "They have put up safety signs and campaigns but they are not following them. They claim to follow them but once the safety officers leave, miners are told to continue working to achieve their targets… So the safety campaigns are just a lip service because in practice it does not work…they are just a way of creating traps to get rid of some workers who never get replaced" (Nkata, 2015).

Based on the above experiences, it is clear that the daily experiences of a mine worker in Kankoyo exposes him or her to a lot of health hazards. A home is therefore a place where this mine worker must recuperate or recover. But the reality is different as the following testimonies demonstrate.

4.4 Environmental costs: Community experiences

Upon knocking off from work, mine workers are welcomed back into their community by air, water and soil pollution as well as falling houses due to blasting.

4.4.1 Air pollution

All the respondents in the study complained that in the morning there is a lot of dust from the mine dust that has been heaped in the area.

> "the moment you come into this Township you even feel the bitter taste and dryness in your mouth and you feel like chocking" (Focusgroup 2, Kankoyo, 2015).

Mine workers living in Kankoyo have been exposed to air pollution mainly from sulphur dioxide since the 1930s when the mines were established. The testimonies of the miners are indicative of their frustrations.

> "The issue is that this whole environment is polluted. Almost everything in this place is contaminated. You don't need to even do laboratory examinations to

> understand that this place is polluted. When you come you will just note the difference. For us our understanding is that the government brought Mopani to come and kill us. The separation of copper involves the use of acid. The acid as you know is very toxic and we are able to smell it in the air. Sometimes we go into town just to breathe some fresh air" (Focusgroup 2, Kankoyo, 2015).

According to the residents heavy pollution is mostly experienced at night when most people are sleeping. They speculated that this was meant to prevent any protests from the people.

> "The amount of pollution is worse in the night. Sometimes there is no smoke but you just experience a choking smell…when the Ministers come here they don't release any pollution…what does that mean? May be they are scared that the government will discover their lies about minimising the pollution (Interview 5, Kankoyo, 2015).

Some days when the wind is blowing towards the residences, the emissions become worse. During this time people's reactions are varied and their experiences make their way of life very difficult. The majority of the workers complained that their experience with pollution can be likened to animals that have been exposed to a pollutant but do not know what to do.

> "Sometimes people who are walking in the township start running about thinking that maybe a different place may be better…we do not even go outside… we just stay indoors because the pollution is so bad that you cannot even see properly… your eyes become very sore" (Interview 2, Kankoyo, 2015).

The other respondent added:

> "In the chest you feel as if they have put chilli and so you start coughing, sneezing and sometimes even vomiting. For children it is worse. They just start crying and regardless of what you do the child will just continue crying" (Interview 4, Kankoyo, 2015).

A number of respondents described some serious incidences:

> "some people faint especially the elderly and those with diseases such as BP (hypertension) and sugar (Diabetes mellitus) (Interview 8, Kankoyo, 2015).

The problem is also complicated by the fact that they experience pollution all year round. Emissions minimise in the rainy season when the wind is blowing towards town centre and Kantanshi. But Kankoyo still experience pollution almost all the time. Because of this, some of the respondents were of the view that they developed a certain degree of tolerance towards the emissions. They argued that a new comer (like this researcher) wouldn't tolerate.

> "We experience pollution all the days of our lives in Kankoyo, how I wish you had come at a time when it had just been released… I mean the real emissions… you wouldn't have managed to conduct this interview or even walk back to the station" (Interview 8, Kankoyo, 2015).

The sulphur emissions have not only impacted on the people but also on domestic animals living in the area.

> "When the sulphur is released "you can even see the dogs crying and you would even feel pity for these animals. Some animals just die by the way side helplessly" (Focusgroup 2, Kankoyo, 2015).

The above testimonies represent the day to day experiences of the working class community of Kankoyo in terms of air pollution. However, disasters have also happened. These have had a significant impact on how people think and feel about their environment, the mine company and the government.

4.4.2 Environmental disaster: the 2014 Acid plant gas leak

The daily environmental experiences for the people of Kankoyo were interrupted in 2014 when there was a leakage from the acid plant. The plant had just been built by Mopani copper mines.

> "Last year we had very serious emissions when there was a problem with their machines. The emissions started at around 04 hours until 09 hours in the morning (Focusgroup 1, Kankoyo, 2015).

The story was narrated as follows:

On the day before the accident, the residents were given letters from the mine informing them about the above normal emissions. The letter advised people to relocate to other nearby places. Unfortunately, no transport arrangements or even alternative place for relocation was organised. People who had relatives in nearby places followed the advice. For those who remained, the story was catastrophic especially for the small ones. The problems faced included coughing, vomiting and diarrhoea (Focusgroup 1, Kankoyo, 2015). They complained that the letter that was distributed to inform them about the abnormal emissions was misleading. They argued that even if the letter was on a Mopani headed paper was not signed by anyone.

> "So most people did not take it seriously, but a day before, the mine brought medical equipment such as oxygen cylinders, IV fluids and other drugs. That day there was a lot of traffic especially the mine ambulance…surely I knew that the following day life will be something else" (Interview 1, Kankoyo, 2015).

The residents complained that they were treated like animals that have no rights at all. The residents reported that, during these emissions an old man with Asthma died.

> "But the company and big people just said he had died from the disease and not from the emissions. The deceased man was one of those people who found their way of life by selling things in the streets i.e. by moving from one house to the other. Unfortunately, he was also Asthmatic and when this pollution was

released the man was overwhelmed and just fail down, by the time they reached the clinic, he had already died" (Interview 1, Kankoyo, 2015).

Another incident of excessive emissions was during Christmas in 2014, in which the District commissioner for Mufulira who was also Asthmatic died while addressing a meeting.

> "The district commissioner went for prayers and she got this bad air and she 'said napema umwela uhubi and I don't know if I will survive', she said this before she died…and so the cause of death was clear but up to now the company is refuting the cause of death, even when they know…when I feel the pain…it is my body…I am the one feeling it. So the problem is that we have no law enforcement" (Nkata, 2015).

These disasters were significant in the sense that the working class community is now able to make comparisons of their experiences.

4.5 Social impacts of privatisation: A caring mine remembered

According to the respondents accidents such as the ones above have become more common after the installation of the acid plant meant to reduce the emissions. It has led to negative moral evaluations of the mining company in the area. At the same time it has led some to think that re-nationalising the mine would be a better option.

> "The situation is very bad now my brother… This mine is killing us…but for the owners in Europe they are busy making money and profit. What ever happened to ZCCM the mines were better under the government. We wish the government could take back the mines" (Focusgroup 1, Kankoyo, 2015).

These responses were common among the women and the unemployed. But generally comparisons were common in all the interviews and focus groups conducted. During the ZCCM days, the company provided everything that made life possible, housing, health, education, food and all other assortment of social benefits. But with the privatisation and eventual sale of the houses all the social services were done away

with. There was common regret that doing away with the ZCCM legacy has transformed the way people lived their lives in negative ways.

> "What happens here is that because of the cost of maintaining water and sewer lines, most of the waste including human excreta find itself in the yards… We are exposed to a lot of diseases in this area and the mine is doing nothing to help mitigate the impact. Instead it is making it worse (Interview 13, Kankoyo, 2015).

4.6 Moral evaluations: What residents think and feel

According to all the respondents, the government of Kaunda had a heart for the people. Not too many people were unemployed, the environment was clean and they were proud to live in the mine area.

> "It is a shame to live in the mines because we are exposed to too much pollution. My father from the village does not even want to visit me…he complains about the pollution each time he comes to visit" (Interview 2, Kankoyo, 2015).

Despite the mining company's efforts to mitigate the impacts of pollution particularly during the disaster (e.g. through provision of health services) there is a general discontent.

> "What the mine is now doing is that when they release the emissions they will send some nurses and some drugs at the government clinic to attend to those people. Those that are very sick will be taken to the mine hospital for treatment for a few days. After discharge that is the end of the relationship. But we also understand that such a person may have other lifelong complications which remain unresolved" (Focusgroup 1, Kankoyo, 2015).

Most of the people who live in Kankoyo now, are either unemployed or are working as contract workers and are not eligible for attendance at the mine hospital. The mine deals with the immediate complaints, yet the long term effects are left to be the responsibility

of the victims. Consequently, the company's efforts of taking victims of pollution to the mine hospital has been criticised by the residents. It was argued that this measure was just a cover up so that the serious cases are not captured by the media.

> "If the company was responsible it would have allowed all residents of this Township to be attending the mine hospital. Most of the diseases that people suffer from are caused by the mine" (Interview 18, Kankoyo, 2015).

Generally, the majority of the residents felt that the company was not a good neighbour and that they were not well treated by the mine.

> "This company does not regard us as human beings. When you look at these high voltage cables that pass near the roofs of the houses…they are so dangerous that they will one day kill all of us. During the rainy season we are scared of even going outside because when you step in the water you can feel the electric currency. They lie to us that it is 15 meters above, but even a blind person can see that they are very close to our houses. It is just a matter of time before people die in this area (Focusgroup 2, Kankoyo, 2015).

As the environmental experience takes a gender dimension, the women appears to be the worst affected. This is because of their role in drawing, water, cleaning the surrounding, nursing the sick children and taking up house chores. It also includes drawing water from distant places to water the yards in an effort to keep the dust down.

> "What we know is that we are the living dead. What is very painful is that while these high voltage cables pose a continuous threat to the people most of us cannot even afford to pay for electricity. This is an issue which the mine would have at least tried to address. If these cables were not dangerous we would have cut them down" (Focusgroup 1, Kankoyo, 2015).

To others it was complete disappointment with the company

> "But are we going to wait until we die from these emissions? They treat us like fools. Last time when they released too much Sulphur they gave each person

one pocket of milk… but can one pocket of milk save a life?" (Focusgroup 1, Kankoyo, 2015).

4.7 Company Responses vs daily experiences

According to Mopani, the acid plant they have built can capture about 97 percent of the sulphur dioxide released from the mines. The company argues that this investment gives them pride because it has improved the lives of the people in Kankoyo (Mopani, 2013). However the workers living in Kankoyo dispute this claim:

> "Our experience is that after the installation of this plant sulphur dioxide emissions have worsened. In fact what I can say is that it is like the 97 percent they claim the plant captures is what the mine releases into the air (Focusgroup 1, Kankoyo, 2015).

Another participant added that:

> "If the emissions have reduced, how is it that they will bring in nurses and doctors and ambulances…when the emissions are being released? If you faint they take you to the clinic and give you milk and they put up a drip. They will send memos to inform us that excess emissions will happen on such and such a day. They think we are animals" (Focusgroup 2, Kankoyo, 2015).

The workers argued that contrary to Mopani's claim of reducing emissions, the acid plant is a bomb waiting to explode.

> "Just last year there was a breakdown at the acid plant and the pollution was so bad that a lot of people were affected. People were fainting, vomiting, coughing, sneezing, sore eyes and skin irritation. It was so bad that the people of the area protested by rioting. Yet they talk about reductions?" (Interview 9, Kankoyo, 2015).

Others argued that:

> "How can they say that a new refinery has reduced the emissions when the impact has worsened? When the roofs continue to be destroyed? As you can see, some houses have fallen down and people were only given three pockets of cement. How can you build a house using three pockets of cement?" (Focusgroup 1, Kankoyo, 2015).

There is clearly a conflict of interests and understanding between community members on the one hand and the state and Mopani on the other. For the members of the community they strongly felt that during privatisation of the mine they should have been given an opportunity to make their case for environmental protection. Water pollution is yet another problem.

4.8 Water pollution

Most respondents explained that water pollution was mainly caused by company negligence.

> "Mopani releases the effluent in a small stream where children go to play… One time fish died because of the acid that spilled in the river… but because of poverty some people got the fish and started selling to other people. A lot of people had diarrhoea and abdominal problems as a result" (Focusgroup 2, Kankoyo, 2015).

For many years people used to draw water that came from the mines for washing and other domestic purposes. This water was highly contaminated as it came directly from the mine without being treated (Interview 10, Kankoyo, 2015). There have been a number of incidences when the company leaked acid in the stream or Kafue River from which a lot of people depend for water. The problem is compounded by what they described as deceit and negligence from the polluter. The respondents complained that at one time when the water was contaminated the company did not inform them. As a result people consumed contaminated water. It took several days before people knew what had caused their diarrhoea and abdominal pains.

> "When they realised that people knew that the truck carrying acid was involved an accident and poured its contents in the Kafue River…they then announced that we should not take the water. In addition, they distributed a packet of milk to each of the residents in Kankoyo. But it was already too late because people had already drunk the water. Can milk save a life? These are the questions that Mopani and the government should answer" (Interview 4, Kankoyo, 2015).

These experiences seem to have been worsened by privatisation.

4.8.1 Privatisation and access to clean water

Apart from contamination of water, the second problem facing the workers living in Kankoyo remains access to water and its availability. They argued that privatisation has worsened their ability to access clean water. All the respondents argued that after privatisation of the water utility companies in the early 2000 access and availability has become a major problem. A wife of one of the miners complained that:

> "Ever since Mulonga Water and Sewerage bought the water utility company from the government the people of this area have had serious problems with water. During the rainy seasons we have problems with diarrhoea as a result" (Focusgroup 1, Kankoyo, 2015).

Access to water has become a means of social classification and consciousness among the residents of Kankoyo. Three social classes were identified. The miners who work for Mopan copper mines directly as permanent employees occupy the upper class of the Kankoyo society. For this class, they had better access to water as they were fairly able to afford. The workers on contracts and those employed in the informal sector occupy the second strata. The unemployed workers, wives, children, the retired or retrenched occupy the last position. For this class of people, the water crisis is a nightmare. In order to get water they have resorted to a broken pipe for their water supply (refer to picture below). As can be seen from the pictures the broken tap is open to pollution especially from the mine dust.

Figure 2 Illegal Water source in Kankoyo



Source: James Musonda, 2015

The residents said that:

> "We draw water from this point because we cannot afford to pay for the water bills after they introduced the water meters. For a long time we never had water in this section (section C) but bills kept accumulating. When the water company was privatised to Mulonga water and Sewerage some of us have water bills of up to ZMW 7000. As a widow I cannot afford to pay that money even I am asked to pay 1 kwacha per month I can't " (Focusgroup 1, Kankoyo, 2015).

Another widow that has lived in Kankoyo for over thirty years explained her problem by saying that:

> "My husband worked for the mine and died from Tuberculosis (TB). What we were given by the mine could not sustain me with my six children…when we failed to pay the water bills the utility company came to disconnect the water and uprooted the water meters. The only way for us was to find any source of water we could access" (Interview 13, Kankoyo, 2015).

Thus while the water pollution problem continue, the privatisation of the water provision has worsened the lives of many people who cannot afford to pay. When asked about how safe it was to drink water drawn from that point this is what they had to say:

> "We know it is not safe but what can we do my brother? We do not have any other source of water. We just wait for the dirt in the water to settle down before we can use it for drinking and cooking. It usually has a bitter taste because of the mine dust which contaminates it every day. When the wind is blowing especially from April to October we have problems with water contamination. When you drink this water it gives you abdominal pains" (Focusgroup 1, Kankoyo, 2015).

It is therefore a situation in which people are forced by circumstances to drink unsafe water because of the limitations brought about by the principal problems; externalisation of environmental costs on the poor and privatisation of the commons. What do the workers in Kankoyo think and feel about their polluted environment?

4.8.2 Compensatory claims

Given their helplessness in the face of a polluting company, the affected people resort to compensatory claims. From the responses provision of free water and electricity would be more comforting for the amount of pollution they suffer.

> "We would not mind much suffering pollution if at least these things are being given to us. We know that this company makes a lot of money…but you see despite all the suffering we have been exposed to, at the mine hospital they cannot attend to you" (Interview 4, Kankoyo, 2015).

The residents felt that water and electricity meters must be removed immediately because they are too expensive for most of them. Many houses have had their water disconnected. These residents feel that nobody is listening to them yet they needed help. According to Mopani employees and citizens water must be provided for free just as it was done during the ZCCM period. Provision of free water, public sanitation, and refuse collection are seen as measures that could help in alleviating the suffering of the people.

> "The provision of social services was a way of reducing the impact of mining and giving back benefits to the people. But with the new owners it's each one for oneself" (Focusgroup 1, Kankoyo, 2015).

4.9 Coping mechanisms: Air Pollution

Due to the many years of pollution, the residents of Kankoyo have come to develop different ways of coping with pollution. These range from escaping, adapting, religious belief, and endurance.

4.9.1 Escaping

A large number of respondents explained that when they feel overwhelmed by the emissions they usually take short breaks by visiting relatives in other places where there is no pollution.

> "Last time I went to Kitwe for a few days just to breathe some fresh air and at least live like a human being. I do this occasionally and when there is a funeral outside this area it becomes an opportunity to leave this polluted environment" (Focusgroup 1, Kankoyo, 2015).

Escaping also had its own limits for those who do not have relatives to go to or are reluctant to accept them.

> 'I would want to go out and visit other places for the sake of fresh air like my friends. The problem is that I do not have relatives to go to. In addition some of our relatives do not want to receive visitors. To them family is mother, father and children. So I avoid visiting such people" (Focusgroup 1, Kankoyo, 2015).

For the workers employment limited their possibility for escaping the polluted environment.

> "It is not possible for me to live this place for even a day. I have been working night duty throughout for the last three months. The nature of my job cannot allow. In any case the overtime work I do in the department helps to supplement my income" (Interview 1, Kankoyo, 2015).

The only option for those who cannot escape is to be brave and adapt to the prevailing situation.

4.9.2 Adapting

Adapting meant the ability to withstand the pollution regardless of the impact.

> "When there are emissions we use wet clothes to cover our faces and close the windows. In this way we are able to survive the pollution. It does not provide complete relief, but it helps…though at times I think it is just psychological to do something like that when there are emissions" (Interview 2, Kankoyo, 2015).

A number of residents have developed significantly high levels of tolerance to the pollution. During the field work the researcher experienced choking smells that made it very difficult for him to breath. The interviews were suspended for that day until the next morning when the environment was a little better. But one respondent said that the pollution experienced by the researcher that day was normal pollution.

> "We don't even complain about it…to us this normal…that is our life day in and day out" (Interview 1, Kankoyo, 2015).

But others still complained that:

> "The environment in this area is very bad. I can tell you that we live only by the grace of God. As I am telling you my wife and our first born child have Asthma, but we just have to live because we have nowhere else to go to" (Interview 8, Kankoyo, 2015).

For others they wake up in the morning and keep watering their yards to settle the dust. This is very strenuous because it requires the drawing of significant amounts of water from some distant place.

> "To get some relief we try to pour water on the yard. Where we draw water is also quite far…so I get very tired doing this almost every day of the year. The other problem is that you spend most of day just watering the yard. When do you look for money to buy food?" (Interview 5, Kankoyo, 2015).

While water was important in coping with the environmental costs, in certain cases it was seen as a danger.

> "When the sulphur is released, I can't even give water to my children. I fear that it may cause more problems. So I just leave them like that until when the emissions go down" (Focusgroup 1, Kankoyo, 2015).

For those who did not think of any coping mechanism they resorted to religious beliefs and endurance. For these their problems would only be resolved by God and not by man. The problems were not however limited to the water and air as the houses were also not spared.

4.10 Housing: experiences

The state of housing is a major problem facing the people of Kankoyo as almost all the houses have one or two problems caused by underground blasting. The following are some of the pictures.

3 Broken houses due to blasting



4 Broken houses due to blasting



Source: James Musonda, 2015

About nine houses had fallen during the time of this study and the pictures are shown below.

5 Collapsed houses due to blasting



Source: James Musonda, 2015

Those who were lucky lived in the above shown houses. But for the nine whose houses had fallen they spent their nights in the tents that were provided by the Catholic Church

6Temporal homes for broken houses



Source: James Musonda 2015

Apart from the cracks and falling of the houses the corroding or wearing out of roofing sheets is another problem:

> "as you can see I just changed the roofing sheets last year but they are destroyed and we have to buy new ones this year again" (Interview 8, Kankoyo, 2015).

In addition, paint is often washed off by the acid rain especially during the rainy season.

> "I have now stopped to painting my house. Each time I paint ….the paint is washed away by the acid rain. You mend the cracks just know that they will come again. Sometimes we even fear that one day this area will sink because of this blasting" (Interview 1, Kankoyo, 2015).

Besides this experience is the problem of soil contamination.

> "as you can see in this area you cannot even make a garden because nothing grows here, the mine has destroyed the soil" (Interview 7, Kankoyo, 2015).

The problem is complicated by the fact that most people in Kankoyo are unemployed. Therefore, the contaminated soils and inadequate water has made it impossible to do even backyard gardens.

> "You see most people here rely on vegetables but they have to be bought from far flung areas which make them very expensive. This soil cannot allow anything to grow yet that is where our children play…that is what we are in contact with every day of our lives. Do you expect us to be normal human beings? (Interview 2, Kankoyo, 2015).

The responses show that some people look at the company with rage.

> "So for me when I see this mine I get very annoyed because it is responsible for most of the problems in this area. We are told that the owners are building universities and all sorts of things in Europe when we are suffering the consequences" (Focusgroup 1, Kankoyo, 2015).

4.11 Chapter summary

This chapter has described the development of the mining industry in Kankoyo Township from the 1930s to the present. The chapter shows that the development of the mining industry was accompanied by heightened expectations among the local people and claims from the government. These expectations were encouraged by the social services provided by ZCCM when the mines were nationalised. They were done away with immediately after privatisation. The withdrawal of the social services has been a major disappointment to many who feel entitled to the benefits of mining investment in their area. However, the mine has continued to provide the state with revenue through taxes and employment to a few people. The mine has also grown overtime and increased production. Yet, for the people of the area the celebration of that growth is lost in their day to day struggles with a polluted environment. For the people who have to wake up to a reality of a polluted environment the disappointment is seen through the many real problems and difficulties they face.

The people of Kankoyo have for so many years suffered from air, water and soil pollution. In addition, access clean to water is another challenge. For the workers, having to face a polluted environment both at home and in the work place appears to be a 'double' tragedy. The problem for this working class community is complicated by environmental disasters that have happened in the recent past. The often cited disaster was the 2014 acid plant gas leak which led to the death of at least two and left many intoxicated with sulphur dioxide. Too many respondents explained that this accident symbolised the worst form of environmental negligence on the part of the company. The community argues that the response from the mining company was inadequate in addressing the long term effects of pollution in preference for the short term. In this sense, the behaviour of the mining company is seen as one that prioritises profit, growth and wealth accumulation at the expense of human life and the environment. As a result of this perceived negligence many people still hold fond memories of the period when the mine collected garbage, was cleaning the environment, and watering the compounds among other services.

Indeed these social services seemed to have been beneficial. Yet as things stand now, it is evident that it was a short term measure. Yet as this study argues, it served only to blind people from the real environmental degradation that has been taking place over

many decades. Based on the accumulated environmental costs such as slug dams and the accumulated dust, it is clear that the environmental problems of Kankoyo are long term. However, this does not justify the denial by the new mining company to take responsibility for cleaning and ensuring a healthy environment for the workers who contribute to the continued survival of the company. Despite all these problems, the hopes for the working class community still lie in the mines. At the same time the continued environmental suffering has given birth to different moral evaluations of the company which can be summarised as 'uncaring'.

In addition, it was argued that the development that mining can bring about seems to be a 'development of environmental suffering'. The company and the decisions it makes such as the installation of the multibillion dollar acid plant is seen with suspicion. Yet the company believes that this measure has improved the lives of many people in the community (Mopani, 2013). Through the accounts of the research participants it is clear that despite the measures taken by the company people continue to experience severe Sulphur dioxide pollution. As some of them submitted, the installation of the acid plant was meant for a profit motive. The company financially benefits from the sale of acid or would save money by not buying acid from other sources.

The chapter also shows that apart from water pollution which causes a lot of discomfort to the people, access to clean water is another major problem. Many people in Kankoyo do not have access to clean mainly due to (a) blocked pipes which have not been changed for many decades, (b) disconnections for failing to settle bills with the water utility companies. In such an environment, those who have access to clean piped water in the homes have emerged as high ranking members of a poor working class community. Apart from this class inequality, access to water has also become a source of conflict between those who have and those who don't. This has forced a number of residents to seek illegal means of accessing water by breaking water pipes that supply the Township. The problem with this is that the water is usually contaminated by dust and hence a health risk to the people.

For the women the challenge of drawing water has proved more problematic to them than men as they have to contend with the daily household chores and caring for the family. Most women spend most of their time drawing water and watering the yards to keep the dust down. In this way the privatisation of the water utility or the privatisation

of the commons appears as a factor that is worsening the vulnerability of the poor to 'environmental suffering'

By showing the state of housing in Kankoyo, the chapter demonstrates the outcomes of the corporate policy on housing through the living experiences of the affected workers. The chapter highlights the impacts of sulphur dioxide on houses in terms of corroded roofing, washed away paint etc., as well as the broken houses due to blasting. As a result, Kankoyo Township can be described by the prevalence of severe poverty, infrastructure deterioration, dilapidated housing, absence of street lighting, open and overflowing sewers. The roads are badly damaged due to the constant traffic, especially trucks carrying copper and cobalt to and from the Mopani site. Yet Kankoyo is host to one of the biggest Coppermines in the world that has been operational since the 1930s. The experience of Kankoyo Township is therefore a case of 'resource curse' in which the extraction and exploitation of a country's abundant natural resources result in under-development and impoverishment of the owners of the resources. While the data presented may be horrifying it illustrates the harsh realities of the people concerned. In the process, the helplessness of the people of Kankoyo in the face of these alarming short and long-term risks is revealed.

5 Environmental costs: Social recognition and responses: Introduction

This chapter presents the different ways in which the affected working class community in Kankoyo Township think and feel about, asses and respond to their polluted environment. In this way, the meanings, interpretations, perceptions and understandings are revealed. The chapter uses the various responses from the mine workers living in Kankoyo to: explain how they understand the externalized or environmental cost of mining on their communities; describe how they perceive their risky surroundings; understand what set of practices accompany these feelings and cognitions; identify what factors contribute to or hinders social recognition; and, to explain why Kankoyo residents continue to live in the area despite the negative environmental impacts. It is therefore hoped that this section answers the main research question of the study: "what is the mine workers social recognition of the environmental costs of mining in the communities and work place?"

5.1 Understanding: Risky environment or situation

Responses from various participants in the study show that their understanding of risky situation. It was also inadequate to inspire appropriate responses. In addition, risky perceptions were varied. For example risky areas such as slug dams, dust and water that come from the mines were often taken as normal environments in which adults and children walked and played without being worried about the impact.

> "When the slag is released from the mines it is less harmful because it would have been treated and it is still important because it still has copper in it. Therefore, the reason why the mining companies protect these slag dams is because there is money in them through the copper and cobalt found there. It is not because of the health hazards otherwise we would have all died including the policemen who guard these places…look at the children who play in these soils" (Focusgroup 1, Kankoyo, 2015).

For others a risky environmental was defined in terms of the physical experiences related with exposure

> "Even if we are not educated what we know is that these emissions are very dangerous. Apart from the smoke and dust we know that there are a lot of other chemicals that we do not know about because we don't have machines. (Focusgroup 2, Kankoyo, 2015).

Others were able to see a situation as risky through the conduct of the company (polluter).

> "The actions of the company also tell us that things are wrong. During the last severe emissions they brought oxygen machines and drips (IV fluids). This means that even they know that their emissions are very dangerous" (Focusgroup 2, Kankoyo, 2015).

For some a risky environment is any dirty environment that people are able to identify. In their view, the dirty environment was related more to infection than to chemical pollution.

> "I think a dirty environment can be a risky environment because it has germs. That is why people are educating us about diseases and washing hands. This helps prevent diseases like cholera and other diarrheal diseases" (Interview 7, Kankoyo, 2015).

Some of the respondents were able to identify pollution as a risky environment but were not sure about what comprised the pollutant.

> "I think that the kind of smoke being produced nowadays is acid which comes in form of vapour. This is not the kind of smoke we used to have in olden days. This is one is very strong" (Interview 8, Kankoyo, 2015).

Generally, the residents particularly women were able to summarise the problems in terms of the effects they were able to see and feel. In their own description their daily experience can without exaggeration be described as an environmental nightmare. To them everything is bad in the area.

> "What we know as you can see for yourself here in Kankoyo is that we are as good as dead…houses get damaged due to underground blasting, roofing sheets get destroyed due to sulphur and other pollutants from the mines. Many people especially children suffer from Asthma, TB and diarrhoeal diseases because of the contaminated air and water caused by this mine. To be frank with you this mine is a problem and it is worse for us who do not work" (Focusgroup 1, Kankoyo, 2015).

This long term exposure to sulphur dioxide pollution has transformed life in Kankoyo. The times when the emissions are released, the volume of the emissions and the health impacts or lived experiences have become the areas of conflict between the residents of Kankoyo, the state police and Mopani. The residents are able to tolerate a certain level of emissions. But at times they protest when emissions are beyond what they have come to regard as normal. However, the complaints are never directed at the emitter in this case Mopani but blame government for all their suffering.

> "The government has neglected us by subjecting us to this kind of suffering. The leaders are just interested in money. Our main problems include chest problems, coughing, sneezing, and fitting especially for children, skin problems, and sore eyes. These could have been avoided had they negotiated better when selling the mine" (Interview 7, Kankoyo, 2015).

Most of the respondents interviewed believed that prolonged exposure to air pollution has had significant negative health impacts, but where not sure of the long term effects.

5.2 Understanding the long-term effects

This study shows that there is a serious lack of understanding of the long term effects of the externalised costs of mining. While a number of respondents believed that moving away from a polluted environment would offer them necessary health breaks others felt otherwise. They argued that escaping will not help resolve the problem. It was argued that for people, who are used to a polluted environment, the bodies had adapted and any shift from that place would be dangerous and fatal.

> "I think that if I go to another place where there is no smoke I can die quickly… the lungs have become used to this environment. One thing I have observed is that when people retire and go to the village where there is fresh air most of them die very fast. My suspicion is that these people have been used to a polluted environment" (Focusgroup3, Kankoyo, 2015).

Quite a number of them also felt that their lungs are dead and that they just have to wait for the day when they die.

> "For me I think it's just about waiting for the day when I die. I have pains all over my body and each time I go the hospital, the doctors find nothing wrong with me. Last time I went to the scan and asked the doctor to do all the examinations they could but still they found nothing" (Interview 13, Kankoyo, 2015).

The understanding of the environmental costs has left some of the residents confused.

> "For me I have been having heavy menstrual periods and I feel like fainting. You know you have a feeling like you are pregnant yet you are not. Now I don't know whether I am just sick or it is the pollution. I went for HIV test it was negative, pregnancy it was negative…I am confused" (Interview 7, Kankoyo, 2015).

A number of the respondents simply had no idea what the long term effects would be. They were only able to speculate about cancer and other diseases. In sum, the respondents complained that they knew how dangerous the emissions were through their physical experiences: dry skins, sore eyes, skin rush, chest infections etc. that people suffer from. However, despite all the above complaints there was generally an acceptance of pollution as normal especially if it remained within levels that did not disrupt their daily routines. Therefore there is a certain level of emissions that are considered normal and abnormal but measured from their physical experiences.

5.3 Social recognition: Claims

The main claims made by the residents included: compensatory social benefits such as free water and electricity, employment opportunities for the youth and the unemployed, scholarships for children, health care and relocation.

5.3.1 Compensatory social benefits

A number of respondents felt that with the level of pollution they are subjected to, provision of water and electricity would help in alleviating problems.

> "We know that the best option for us is to relocate. But how long are we going to wait for that? Everybody talks about relocation yet nothing happens. Mopani has refused to relocate us saying it is very expensive. That is why for me it is better that we are given free electricity and water, so that we only worry about the pollution" (Interview 5, Kankoyo, 2015).

This was justified by the fact that provision of these services will help in reducing pollution through the use of firewood which produces more smoke. The provision of water would help reduce the burden of having to move long distances in drawing water for managing the dust.

> "In fact giving us water and electricity by this company is not doing us a favour because they are the ones causing the dust. When they give us electricity it means they are just trying to ease our pain for the suffering they cause" (Focusgroup 2, Kankoyo, 2015).

For the women and most of the unemployed youths the biggest problem was with employment opportunities for their children and themselves respectively.

5.3.2 Employment opportunities

The participants argued that the reason most of the youths in the community were becoming addicted to alcohol and drugs was because of lack of employment.

> "It is often said that an idle mind is the devil's workshop. So we can solve the problems of beer drinking, crime and prostitution. What we need is to provide

these people with jobs and the mine can do that, they are just not willing" (Focusgroup 1, Kankoyo, 2015).

The provision of employment was also seen as a solution to the problem of poverty in the area. The participants argued that poverty weakens people's immunity. Therefore, if a lot of the people in the area had jobs and income, this can result in the reductions in poverty and help improve people's lives.

> "Most of our youths die very young because they take beer on empty stomachs. Added to a polluted environment and the stress of not having a job this becomes a huge problem" (Interview 18, Kankoyo, 2015).

5.3.3 Scholarships and health care

For others, the provision of scholarships for their children will help in alleviating their long term problems.

> "If my child is given a scholarship, then he will be able to complete school, find a job and find some where to live not here. May be one day my child can also build me a house somewhere else" (Interview 7, Kankoyo, 2015).

For many, the provision of health care was among the most important measures that would help.

> "People here have a lot of health problems which are caused by the mine. All we can ask for from the mine is to grant us access to the mine hospital whenever we are sick…not only when there is an emergency but all the time" (Focusgroup 1, Kankoyo, 2015).

If it was not possible to provide health to all, the company can at least provide health care to the children.

> "My child here was born with Asthma and in most cases she goes in crises. So if the company can consider such young children it can be better…but they don't care and they don't even come to talk to us to hear about our problems" (Interview 13, Kankoyo, 2015).

Yet others felt that relocation would be a better solution.

5.3.4 Relocation

The arguments for relocation from Kankoyo to another place were based on the need to prevent the young children being born from suffering the same fate. The old ones who have lived in the area for a long time strongly believed that the pollution has damaged their lives. A number of residents however complained that the government and Mopani have failed to sort out this problem.

> "When we go to Mopani, the company says we have given all the money to the government to take care of all those problems" (Focusgroup3, Kankoyo, 2015)

Yet

> "When the government came here they said they have already identified the place and they were looking for money but up to now there is nothing coming" (Focusgroup 1, Kankoyo, 2015).

Due to these delays, others were of the view that they should be paid money in order for them to find alternative places for relocation.

> "If these people can't find a place for us let them just give us money then each family will choose whether to stay or relocate to some other place. We are tired of these promises which they don't even fulfil" (Focusgroup 2, Kankoyo, 2015).

As the pollution of Kankoyo continues and the promises of relocation remain unfulfilled, a number of responses have emerged.

5.3.5 Community responses

Amidst the many complaints against the mine, a number of people still felt that the closure of the mine would not be in their best interest.

> "The closure of the mine will be the end of all of us, you know even those people who don't work they depend on us workers for some piece jobs. If you look at me I have six children plus another three of my brothers and nephews

> and if the mine is closed who will look after these people? (Focusgroup 2, Kankoyo, 2015).

Instead of closing the mine;

> "What is just needed is to find a way of reducing these emissions or even giving people some milk to clean their chests, changing of iron sheets and paint, repairing the damaged houses and sometimes watering the dusty area" (Interview 11, Kankoyo, 2015).

Alternatively;

> "If the emissions are released in the normal levels it is not much of a problem. The problem is when they release it in such a way that even the sky is covered. In that case you have people coughing, or when people die like last year… (Focusgroup 2, Kankoyo, 2015).

Yet for others it was as simple as the following:

> "For me if the mine can just give us free water and electricity as a reward for causing this pollution I would not mind. These people must know that they are killing us and our problems are being complicated by the lack of water and electricity. Look at the dirty water we drink, in our houses they have disconnected our electricity by ZESCO because we cannot afford to pay…the mine should consider looking into these problems" (Interview 2, Kankoyo, 2015).

This statement reflected the views of most of the respondents interviewed. Generally, people carried on with the routine tasks and the issue of pollution was only raised when prompted to talk about. Life in Kankoyo happens normally as people mingle, do their shopping, meet at social clubs, go to church and go about their daily life activities.

5.4 Environmental activism

The majority of the people who are active in environmental activism are the unemployed youths. The women were also reported to have staged a demonstration at the Mopani offices in the years before but this did not go beyond that. Environmental activism is reactionary and specific to air pollution that is considered abnormal. The physical discomfort caused by severe Sulphur dioxide emissions trigger the responses which are mainly riotous and violent. During the 2014 gas leak (noted above), the angry youths mobilised themselves and rooted Mopani property as they tried to destroy the acid plant.

> "When the emissions were released, a lot of people experienced chest complications, vomiting, fainting. One man died. So the youths rioted and broke some property at the mine offices (Interview 15, Kankoyo, 2009).

The protests were mobilised on basis of mob justice by the hungry youths. Unfortunately, there was no organised leadership for these protests and immediately after the protest stopped there was no follow up. This has implied that there is no recognisable leadership from the community to bring the members complaints before Mopani and the state in a more organised way. The majority of the respondents showed a defeatist attitude towards environmental activism.

> "We have tried to talk about these emissions…who doesn't know about the Kankoyo story? It is there on internet, the Vice President's office is aware. But they are not doing anything about it…so we just have to pray to God. Maybe one day things will change" (Interview 12, Kankoyo, 2015).

There was a general feeling of disappointment towards the government:

> "It's like we don't even have a government in this area. As for the Members of Parliament they only come during elections after that they disappear. When you come to the councillor, he is talking about relocation to another place but he is also staying in Kankoyo. When you complain to him he says I am also affected let us give the government more time…but how much time can we give government when people are dying?" (Focusgroup 2, Kankoyo, 2015).

There are number of factors that trigger community responses and one of them was the decision by the company to ban the youths from re-mining the slug dam that lies adjacent to the Township. This acted as a source of income especially for the unemployed youth and in this way compensated for the environmental suffering. Thus preventing this activity triggers the protests much more that the environmental effects.

> "They are poisoning our compounds but at the same time they cannot allow us to make some money from the slug dams…they have put an electric fence and brought police with guns and we find this to be unfair" (Interview 14, Kankoyo, 2015).

5.4.1 Challenges to community mobilisation

The main participants in community mobilisation against environmental costs of mining in Kankoyo are the youths and mainly the unemployed. This participation is however problematic in the sense that the acts of stealing company property renders the protestors as thieves in the end.

> "Quite alright the youths will protest but the problem we have is that they also steal things from the company. When they are caught they report on the news that thieves broke into the mine instead of reporting that we are protesting against the pollution" (Interview 14, Kankoyo, 2015).

The problem with this is that:

> "When these youths are taken to court there is no one to talk on their behalf. As a result we are now afraid to protest because there are a lot of interests that come in" (Interview 3, Kankoyo, 2015).

The protests have therefore been unorganised, unsuccessful and without identifiable leadership to advance the community interests. Yet they have led to class divisions.

5.4.2 Class and community mobilisation

The status of employment is an important factor determining participation in community mobilisation in Kankoyo. One of the common responses to explain the unsuccessful community mobilisation against pollution was that the community was segmented in different classes with different interests. For example, when the community protests against the company the employees do not participate.

> "In my view the reason we are not united is that those who work for the company do not seem willing to fight their own company for fear of the losing the jobs and salary they get. Those of us who do not work want to fight the company but we are seen to be jealous against those who work" (Focusgroup 1, Kankoyo, 2015).

In response, most workers argued that even if they wanted to participate in environmental activism they were faced by a lot challenges that prevented them. According to the workers both (Mopani and contract) the fact they worked very long hours meant that they often arrived home late and were too tired to engage in other activities (Focusgroup3, Kankoyo, 2015; Focusgroup 2, Kankoyo, 2015). For others they worked awkward shifts that would not allow them to meet with the other members of the community (Focusgroup3, Kankoyo, 2015). The fact that they worked in different work places made it impossible for them to mobilise. Other factors such as noisy work place environments and the demand from their bosses to dedicate all their time to production prevented any opportunity for mobilisation. The fear of losing jobs by the working class was another important factor that prevented their participation in environmental activism.

> "Quite alright you can participate in the protests, but what happens when the company sees you? You get fired, and when you get fired, no salary, the children suffers. So it is better that you support those guys who are not working in the protests because they have nothing to lose" (Interview 14, Kankoyo, 2015).

This reluctance was seen in their inability to raise environmental issues in the work place.

> "Bringing the issue of pollution to the company, where do you even start from? This is a private company and these houses have been sold to us and the company has nothing to do with what happens in the surrounding areas. No one is even ready to bring that issue to the company. If the company fired you, where would you take this matter? (Focusgroup 2, Kankoyo, 2015).

The fear of loss of employment was widespread.

> "A lot of people have lost their jobs and we have seen the problems that they go through…many of them have died of depression, poverty and other diseases. I wouldn't want to lose my job…if the pollution is too much for me but I am able to get a salary I will simply shift from here and go to a place that is better" (Focusgroup 2, Kankoyo, 2015).

Another participant explained that:

> "Nowadays we are not sure whether tomorrow you will have a job…right now we are told that because of the global price problems with copper a lot of people will lose jobs…so we just live by the day" (Interview 13, Kankoyo, 2015).

Yet work is very important regardless of the wage one gets.

> "For as long as you wake up in the morning and you go for work knowing that at the end of the day you get something is better than nothing. If you don't work for the mine it is very difficult to find any other job in Mufulira because there are no companies" (Fieldnotes, Kankoyo, 2015).

On the other hand being employed or not has led to conflicts between the classes within society especially women.

> "These guys think they are special, because they can pay for water, electricity and food…so they don't want to be part of community struggles. Yet if they started talking about these issues in the work place the company would know the problems we are facing" (Field notes, 2015).

Consequently those who work are targets of crime as one of the employees complained.

> "I am always buying light bulbs and bulb holders because when you are sleeping or working night shift the thieves come to steal. You cannot leave your house open because they will steal anything they find. Surprisingly this is not common to my neighbours who don't work" (Interview 11, Kankoyo, 2015).

The other common challenge was the much publicised trade agreements on the role of the company in environmental issues.

5.4.3 Privatisation agreements

According to these workers the trade agreements signed on privatisation have provided enough legal protection to the employer such that challenging them on environmental issues will not yield anything.

> "Even if we were to take Mopani to court they will just produce the trade agreement and the court will support them… so there is nothing we can do about this problem. The government sold us" (Interview 19, Kankoyo, 2015).

This means that while communities have no legal claim to a safe and clean environment, the only option is to blame the government.

> "We know very well that the company has no problem because they are here to make profit. If I start a business, I need to make money. A contract is a contract. I cannot therefore blame Mopani for the environmental suffering that we go through here in Kankoyo. I blame all this on the government" (Interview 2, Kankoyo, 2015).

The government should have taken into consideration the lives of the people when they were selling these mines and when signing the development agreements.

> "The government must be blamed because they like money too much…now look at how we are suffering. This pollution that is being produced now is more like acid. They have been lying that when they put the acid plant the pollution

> will reduce. But the situation has now become worse, what kind of government is this?" (Interview 4, Kankoyo, 2015).

These comments about the privatisation agreements led to a general feeling and expression of disappointment at the sale of the mine to the private company. After the privatisation of the mines in 2000 there was hope for the people in Kankoyo of a better life as they saw renewed activity, new equipment and machinery coming into the mine.

> "When the mines were sold and we saw the white man coming back, new equipment, machines and underground trucks we had a lot of hope that things are now improving. At that time some of us where acknowledging that Zambianisation had failed let us just give back the mines to whites they can run them better" (Interview 17, Kankoyo, 2015).

However, several years after the privatisation of Mufulira mine, the people of Kankoyo realise that their hopes will never amount to anything

> "People were saying that we just need to give the mines some time before we start enjoying. It is over fifteen years now and we are not seeing any improvements. Things are just getting worse, no jobs, bad environment and increasing poverty. I think the mines were better when they were in the hands of the government, we are suffering more now" (Interview 19, Kankoyo, 2015).

Further, the privatisation of the mines in Kankoyo has increased the vulnerability of the workers to environmental suffering.

> "In the time of ZCCM if you have a problem in the mine compound we just used to go to the housing department and things will be fixed. But now we cannot even bring the issue of pollution to the shift boss, mine captain or general manager. If you are not careful they can even fire you. In order to keep your job the best is to keep quiet about the issues at home" (Interview 4, Kankoyo, 2015).

The environmental situation is further complicated by the absence of trade unions in the community mobilisation.

5.4.4 Trade union responses

There is virtually no involvement in environmental activism by trade unions in Kankoyo. There are four trade unions representing workers: Mine Workers Union of Zambia (MUZ), United Mine Workers Union of Zambia (UMUZ), Zambia Union of Nurses Organisation (ZUNO) and National Union for mine and Allied Workers (NUMAWU). The Chairman for MUZ in Kankoyo explained that the recognition agreement between the union and management was very clear on the issues that needed to be brought on board and that the environmental question was not one of them.

> "It would be a breach of the agreement to bring in issues that are beyond the scope of our agreement. Our role as a union is to fight for a good salary so that it enables a worker to live well and take care of the environmental problems in their area" (Interview 16, Kankoyo, 2015).

According to the union representative conducting work as a union representative has become a huge problem in recent years.

> "It is difficult to negotiate with these guys nowadays because of the cost saving measures they have put in place. Each time you talk about expenditure on workers, it comes back to cost saving. So bringing an issue which is outside our mandate as a union cannot even be tolerated" (Interview 16, Kankoyo, 2015).

As a result the role of the trade union on the issue of the environment is absent. It was also noted that the unions do not even receive complaints about the environment from members.

> "I have never received any complaint about the environment brought to the union. However, we have seen the problem. I live in Kankoyo myself and I experience these things. But it is beyond the union, especially that the mine was sold" (Interview 16, Kankoyo, 2015).

The union leader also complained that the multiplication of trade unions in the mining sector brought about by economic restructuring have caused more problems for them.

> "We have four unions representing the same workers. All of us are competing for members and we know that the most important issue for the worker is the salary. So our focus is to look at how we deal with these issues first. You can talk about the environment but if the other unions disagree what do you do?" (Interview 16, Kankoyo, 2015).

These responses were confirmed by the employees interviewed.

> "We cannot even bring this issue to the union and every worker knows that. These guys are failing to negotiate good salaries for us. So brining issues of the environment to the union is a non-starter. Because they are failing to do even their job" (Interview 21, Kankoyo, 2015).

The above responses explain the total absence of the trade unions in environmental struggles in Kankoyo Township. In such a situation the only hope for environmental struggles is left in the hands of the environmental organisations and the individual community members.

5.4.5 Environmental organisations

There are no recognisable civil society organisations working on the environment in Kankoyo. But a number of grass root organisations have sprung up. Notable among them being: the Copperbelt Urban Livelihood Project (CULP), Development, Education and Community Project (DECOP), and the Citizens for Better Environment (Ng'ombe, 2008, p. 7). Others are Green Peace, Green and Justice and a number of small organisations. These organisations have been seen to be concerned mainly with land, poverty and resettlement issues than the environment in general. One of the points emphasized by the environmental organisations is the mitigation and adaptation to the negative impacts of environmental pollution. For example according to Green and Justice:

> "We always make it clear to the community not to take the law into their hands by damaging the mine property or doing any harm as a way of reacting to pollution. We have emphasised the procedures and guidelines of airing their grievances to the relevant authorities before they react" (Nkata, 2015).

The community members have preferred a more militant reaction from the environmental organisations and for that reason they feel that the organisations are incompetent and corrupt.

> "When the environmental organisations are called for meetings, they are given lunch, drinks and money…and then they come back to tell us not to protest. Yet they don't give us any positive feedback from the meetings they attend" (Focusgroup 1, Kankoyo, 2015).

Environmental organisations' understanding of the environmental organisations is anchored on minimising and adaptation to the pollution.

> "We now have agreed with Mopani that whenever there is a repair, breakdown or maintenance that results in abnormal emissions the company should notify the community… by going round the community so that people are made aware of the excess emissions…this is so that people can find ways of coping with the emissions or even relocating to other places during that period" (Nkata, 2015).

The issue of relocation did not come out as a priority from the environmental organisation.

> "We are doing the sensitization in the community to make people understand that we need to do this before the solution is found. If they can't find ways and means of making that acid plant safer then relocation can take place… but we are still waiting upon government" (Nkata, 2015).

The disjuncture between the community members' demands and the representatives' priority has led to loss of confidence in the environmental organisations. This has landed the environmental organisation with problems of legitimacy and hence their weakness in forging a mass mobilisation.

5.4.5.1 Challenges for environmental organisations

The challenges faced by environmental organisations include: economic, intimidation from government and pressure from community members.

> "Our organisation and most other organisations in Kankoyo are very small…coming from the grass route with no financial capacity to take up legal issues. We need proper funding... We can have evidence but we have no support and capacity e.g. even to do post-mortem. This is the challenge and that is why it is difficult for us to intervene in these matters. Because of this, the government and Mopani can manipulate and take advantage of the situation. They know that we cannot go anywhere or take any case further" (Nkata, 2015).

In addition to the economic problems that environmental organisations face is intimidation from state officials. After the 2014 gas leak protests the chairman for Green Justice was detained and interrogated for a day on accusations of inciting the community. There ideological grounding for their struggle was not clearly indicated. In addition, the organisations lacked office space, organisation structure and strong alliances to support their cause. In this way they lacked capacity to gain the confidence of not only from the Kankoyo residents, but also that of the wider public and donors. Further, alliances with trade unions which are the biggest social movements in Zambia were not even conceived by the environmental organisations interviewed. But they were happy to work with the 'polluter' Mopani.

> "But I think the only hindrance may be that the union may want us to affiliate to them. Secondly I think we have different interests because the unions are interested in wages and conditions of service as opposed to environmental problems. But we think that the corporate affairs of the company is more approachable" (Nkata, 2015).

These weaknesses in the environmental organisations have meant that the working class community has to deal with their issues through the state. However, the relationship between the state the community is characterised by contestations, parallels and conflict.

5.4.6 State responses

There are three ways of looking at state responses to the Kankoyo problem. The first is to examine how state actors such as the area councillors look at the environmental problem in Kankoyo. Second is to examine the state responses during the protests. Finally, we examine the workers and community members' perception of the state responses. The attitude towards environmental impacts of mining by the state was one of denial, mitigation and adaptation to the environmental problems. From the point of view of the area councillor, the pollution problem is slowly improving and that with time the problem will soon be resolved. The following picture summarises the councillor's attitude towards the environment.

7 Overview of the Kankoyo Environment



Source: James Musonda, 2015, Kankoyo.

In the above picture in the midst of environmental pollution and filth the councillor has put up a poster that claims that this is a "Clean and safe place which people have maintained" and signed off by the councillor of the area. These comments were confirmed by the councillor who argued that:

> "The company and the government are doing very well in terms of pollution because if you look at previous pollution before the acid plant…there is a lot of improvement. Very soon the government is thinking of revegetating the area" (Discussion, Kankoyo, 2015).

He added that:

> "People must understand that these mines were closing and had it not been for privatisation the situation would have been worse…so people must appreciate this investment. What is needed is to find ways of making life much better e.g. through provision of medical services and not to allow protests. This mine does not belong to the whites, we are the owners and if they go we will lose" (Discussion, Kankoyo, 2015).

According to the councillor relocating the people stalled due to lack of funds.

> "When it came to relocating the issue was on who bears the cost? Mopani said we have already paid your government all the money…everything to do with relocation is not our responsibility. So the Vice President came and we started making plans about raising funds for that purpose. But soon our after that President (Michael Sata) died… and now we have a global crisis and the copper price has gone down. We need to be patient because these things take time…people have to be patient (Discussion, Kankoyo, 2015).

The councillor added that rioting and vandalising the company property is as good as destroying one's own property. People need this mine for economic development of the country.

Secondly, community members have complained against state responses during the protests. For example during the gas leak of 2014 and the eventual protests, the state police were quickly mobilised to stop the riots. A number of youths were arrested and others injured. The police also decided to throw tear gas in all almost the households.

> "Can you imagine how a normal person can throw teargas in another human being's house? Some homes had children, the old people as well as those with chronic diseases" (Interview 12, Kankoyo, 2015).

Another resident added:

> "What we expected was the government or even the company to call a meeting and explain to us what was happening and what they were going to do to help

> us… but this did not happen instead people were brutalised" (Focusgroup 1, Kankoyo, 2015).

All the respondents complained that the families of the people who died due to the emissions had not been compensated. The company denied responsibility and the state could do nothing.

> "It was very sad…you know these people (Mopani and state) are crooked…whatever they did…but at the end of the day it was concluded that the victims died of the Asthma and not from the Sulphur dioxide emissions…the company or government could not even provide a coffin or even food for the funeral…..nothing was provided. It is really a sin to be poor. I wonder how people can even continue to work for these guys because they are heartless" (Focusgroup3, Kankoyo, 2015).

As a result, police brutality has had far reaching implications on future protests.

> "I couldn't believe the way the police reacted... they came with tear gas, arrested and beat some boys very badly…can you think of it as if they are not Zambians…I have never seen such a thing before in my life. The boys were unarmed even if they were breaking things…these police people should that know these whites will one day go back to their countries… and this country will remain worse than it is now when there is still copper underground…they forget that they cannot go to these whites to ask for any help. This is why some of us will never take part in these protest (Interview 1, Kankoyo, 2015).

According to most of the respondents the police needed to show some kind of patriotism and a spirit of 'Ubuntu' i.e. by being considerate of their fellow Africans.

5.5 Chapter Summary

This chapter set out to investigate the ways in which the working class community in Kankoyo Township perceive (understand), asses and respond to their polluted environment. Through these responses, the chapter reveals the contestations, understandings and conflicts around mining, development and the environment. The Chapter also describe the roles played by the mining company, community, workers, the state, trade unions and environmental organisations. In the process five key themes have emerged: (a) risk perception (b) social transformation, claims and responses (c) class politics (d) trade union responses and environmental organisations and (e) state responses.

(a) Risk perception

The chapter shows that the understanding of risky situations among the residents of Kankoyo is very poor. For example risky areas such as slug dams, dust and water that come from the mines were often taken as normal environments in which adults and children walk and play without being worried about the health impacts. At the same time these understandings were in certain instances conflicting and confusing. This is because some members were of the view that when the slag is released from the mines it is less harmful. They assumed that it would have been treated. While others argued that the slug was the major cause of the pollution that has led to respiratory, eye and other infections among the residents.

The different ways of understanding risky environments included: (a) the physical experiences i.e. the chocking smoke, dust, corroded roofing sheets, and washed away paint and the bitter taste in the polluted water. To these people even if they did not know the actual polluting agents, they were sure that some dangerous chemicals were behind these processes. (b) The behaviour of the company during an emergency was another indicator of a risky situation. This group was of the view that if the company brings in emergency medical equipment and medications, then they were faced with a risky situation. (c) This group of people were able to identify a number of things in their surrounding as being contaminated e.g. slug dams, leach plants etc. But were not clear about the exact impact this could have on the environment and people's health. They were also not sure about the chemical elements contained in their observed risky environment. (d) This group which comprised mostly women, was of the view that

everything in Kankoyo was contaminated and that they survived only by the grace of God. This claim was in their view justified by the many different diseases that people of Kankoyo suffer from. Examples include respiratory infections (including Tuberculosis, Silicosis, bronchitis, Asthma etc.), eye infections, diarrhoeal diseases, skin and other unknown long term illnesses.

As a result, despite the general discourse and complaints about the environmental problems there is a palpable confusion and inadequate understanding of what constitutes a risky environment. This has led a number of people who are not sure about the long term impacts to conclude that relocating to a place without pollution may be fatal. They justified this by saying that they had become accustomed to the pollution. Others argued that the long term exposure have caused enormous health problems which even the medical staff have failed to diagnose. The only way for them was to wait for their death.

(b) Social transformation, claims and responses

The long term experience with environmental costs has transformed life in Kankoyo and brought different claims and responses. In escaping the pollution, some people have become seasonal migrants. Others experience life as punishment from the company that ensures their economic survival. This has led to a number of compensatory claims on the state and the company for the pollution suffered. These include: benefits such as free water and electricity, employment opportunities, education scholarships, health care and relocation. The claims have been justified on grounds that it will provide relief for pollution suffered. Secondly, they feel that by virtue of living in the area where minerals are mined they should be entitled to the benefits. Thirdly, it was argued by the workers that such provisions were necessary from a company that cared for the health of its workers who keep in turn the mine going. The problem however, has been that the absence of an organised team or leadership to drive the struggle. As a result the claims have not been presented in an organised way to government and Mopani. While relocation has been proposed by the government it remains unimplemented due to financial challenges and as others argued, lack of political will.

The times of release, the volumes and the physical impacts of the emissions have emerged as a point of conflict among the residents. A certain level of emissions measured through the physical experiences is tolerated. But anything beyond that has in

the previous past resulted in protests. The chapter shows that main environmental activists are the unemployed youth. The women were also reported to have staged a demonstration at the Mopani offices in the years before but this did not go beyond that. Environmental activism is reactionary and specific to air pollution that is considered abnormal. The protests are directed at the mining company and the state police.

The recent protests in 2014 were triggered by two factors. (a) The decision by the company to ban the youths from re-mining and wire fencing of the slug dam that lies adjacent to the Township. This activity was as a source of income for many unemployed youths. (b) The abnormal emissions of Sulphur trioxide which led to the death of two people. The youths argued that it was unfair for the company to cut their source of income when it was poisoning their compounds and killing people. However this youth led activism is also problematic. The acts of stealing from the company during the protests by some youths render the protestors as thieves. This means that when they are caught by the police, what comes out on news is that thieves broke into the mine. In the end, the struggle against the pollution is undermined or even unreported.

(c) Class politics

This chapter shows that three class divisions define the Kankoyo community. The first class consists of Mopani employees with permanent and pensionable jobs as well as other public service workers in the area. The second involves the contract employees working in Mopani. These work on short term contracts and are paid relatively lower wages and poorer work conditions compared to Mopani employees. The third category consists of the unemployed youths, women, retrenched and retired mine workers, the aged, and children.

However, participation in the protests has made more visible these class divisions in the community. In terms of participation, the community of Kankoyo is divided between those who work and those who don't. The working class are reluctant to participate in the protests for a number of reasons. These include, (a) the fear of losing employment if seen in the protests, (b) long working hours and were too tired to take part in the protest, (c) absence of a common mobilising platform as they work in different work stations, and (d) inadequate time to discuss environmental issues during working hours as they dedicate most of their time at work to production.

The unemployed recognise the important role that the working people would play in advancing their environmental interests. But the fact that the workers are unable to participate is taken as frustrating the struggle. The other challenge to mobilising against pollution was the privatisation agreement on sale of the company. They argued that the contractual nature of the privatisation agreements make it difficult to challenge Mopani on cleaning up. These agreements exempts mining companies from liability for historical environmental costs but have also been used to escape liability for present pollution. Consequently, in accounting for their misery the residents blame the government for neglecting them. They argued that the government should have taken note of the environmental concerns of the people before the sale of the mine. Secondly, they felt that even after privatisation, the government has done very little to mitigate the impact of the environmental costs of mining on the people. But through the police the government has not only frustrated the environmental struggles but also silenced the voice of the people.

(d) Trade union responses

The helplessness of this is further complicated by absence of trade unions in environmental struggles. Trade union leaders in the area are of the view that environmental struggles are beyond the trade union mandate. The unions also identify the multiplicity and fragmentation of trade unions as a problem that has weakened their capacity to engage on other issues beyond wages. The union thus find itself in a struggle for membership, legitimacy and survival for which wage issues are seen as key. The absence of trade unions in environmental struggles has led the workers to avoid involving the unions in such matters. The workers generally feel that the union has become too weak even when negotiating the wages and conditions of service to be involved in environmental issues.

(e) Environmental organisations

Further, the weaknesses in environmental organisations in the area have denied the community the ability to present their demands in an organised way. The prominent organisation in the area is Green Justice. The community members have wanted a militant environmental organisation. Yet Green Justice emphasizes dialogue, minimising pollution and disciplining the community against violent protests. The organisation recognises the economic importance of the mine to the community. For this reason, it advocates for what they called ‘a win- win’ situation including a bit of

sacrifice to keep the mine operations going. As a result, Green Justice finds it more convenient to cooperate with the mining company and not the trade unions on environmental issues. The challenges faced by the environmental organisations include lack of finance, office space, and state intimidation among others. Because of these challenges environmental organisations working in Kankoyo face problems of acceptance and support from the community. It is on this basis that the environmental organisations are regarded as being corrupt and always siding with the polluting company.

Despite the many complaints against the mine and about the pollution it causes, the local people feel that closure of the mine is not the answer to the problems of the area. Many participants argued that the closure of the mine would be the end of their lives. It was argued that by providing income to the mine workers, the mine was also helping the people who depend on these mine workers. The solution was in identifying ways that would lead to the reduction of the emissions because the new acid plant had failed.

6 Conclusion and discussion: Introduction

The development of the mining industry in Kankoyo Township in the 1930s led to heightened expectations of a good life for the local people and a source revenue for the government. These expectations were encouraged by the social services provided by ZCCM during the period that the mine were nationalised and done away immediately after privatisation. The withdrawal of the social services has been a major disappointment to the majority of the local people who feel entitled to the benefits of mining investment in their area. These expectations are justified by the fact that, the people of Kankoyo have for so many years suffered from air, water and soil pollution due to mining operations in the area. In addition, access to clean water is another challenge. For the workers, having to face a polluted environment both at home and in the work place appears to be a 'double' tragedy. The problem for this working class community is complicated by environmental disasters that have happened in the recent past. As a result, for the people who have to wake up to a reality of a polluted environment, mining investments seem to bring what appears to be a 'development of environmental suffering'.

Therefore, this study set out to investigate the ways in which the working class community in Kankoyo Township experience, asses and respond to their polluted environment. Through these responses, the study reveals the contestations, understandings and conflicts around mining, development and the environment. The study also describes the social changes that experiences with environmental costs of mining have brought on the community of Kankoyo. It also interrogates, the different roles played by the mining company, community, workers, the state, trade unions and environmental organisations. The general aim of the project is to understand the environmental conditions in which the people who produce copper ore that makes up cables and wires worldwide work and live. To achieve this, the research focused on the experiences and social recognition of environmental costs (mining waste) by the working class community living near the mine. The study utilizes, participant observations, a total of 21 in depth semi-structured interviews, three focus groups, and a number of informal discussions involving mine workers and community members to come up with these findings.

6.1 Mining and development

This study reveals growing frustrations with the failure of the mining industry in Zambia to meet the heightened expectations it brought about. Kankoyo Township can be described by the prevalence of severe poverty, infrastructure deterioration, dilapidated housing, absence of street lighting, open and overflowing sewers. The roads are badly damaged due to the constant traffic, especially trucks carrying copper and cobalt to and from the Mopani site. Yet Kankoyo is host to one of the biggest Coppermines in the world that has been operational since the 1930s. Based on existing literature and findings in this research, this report argues that the provision of services and housing to the mine workers in the name of developing the country has been detrimental to the environment. This is because it diverted attention from the long term and ongoing environmental degradation that has taken place overtime. This argument is based on the accumulated environmental costs such as; slug dams, the accumulated dust heaps, leach plants and long term environmental degradation in the mine Townships on the copperbelt.

The findings of this study represent the extent to which the people of Kankoyo express their expectations of a better life to come from mining. These accounts confirm earlier accounts regarding the expectations of modernity (Ferguson, 1999; Mususa, 2012) and provision of social services as a responsibility for the government and mining companies (Cunningham, 1981; Fraser & Lungu, 2007). More importantly, these accounts also describe in respondents' own views, their interpretation of development leading to an emergence of what appears to be a 'development of environmental suffering'. There is no doubt that mining in Zambia has development beyond what it was in the 1930s. In addition, it has also made huge contributions to the state in form of taxes and royalties and infrastructure development. In addition, it has for many years been a source of employment for many Zambians. Yet for the people of Kankoyo these economic benefits are lost in their daily struggles with a polluted environment. In this situation, out of the expectations of a better life emerges the nightmare of air and water pollution and dilapidated housing.

These findings enriches Ferguson's (1999) argument that mineral resource led development is a myth and as Mususa (2012) argues leads to villagisation. This refers to a situation whereby formerly urban towns now look like villages. This study argues that the Kankoyo experience shows some elements of a village through the ugly buildings. But in many respects, the normal village setup in Zambia is one that has abundant vegetation, trees and fresh air all of which are absent in Kankoyo. Can we liken Kankoyo to a prison? Unfortunately, there is no prison in Zambia which as polluted as the Kankoyo community. The only option then is to classify Kankoyo as an environmental disaster and as one of the respondents put it 'a bomb waiting to explode'.

Therefore, the Kankoyo findings challenge the popular argument about development as bringing about a good life as Peet & Hartwick (2009) describe. It shows that the development happening in Kankoyo and in Zambia will never reach the level that these authors described. But in many ways the Kankoyo story confirms the inequality arguments inherent in mining capitalism in Zambia. This study also confirms Frederiksen's (2010) conclusion that from inception, as wealth poured from the Copperbelt it left little mark on the rest of the country, only a residue of inequality. The modernity, progress, wealth and transformation of the Copperbelt were surrounded by deprivation, widespread poverty, famine and disease, with infant mortality around 30%. He argued that the conditions of life for most Zambians had deteriorated in the first decades since British rule was declared in the 1890s (p. 18).

The evidence in Kankoyo after many years of this observation still reflects the same reality. This provides sufficient evidence to argue that the relationship between mining, development and the environment is mired by inconsistencies, disappointments and failures in face of capitalist accumulation. The findings also challenge the popular argument by politicians and IFIs that mining extraction will lead to economic and social development and a better life for all. Instead it creates more problems for people in the midst of unmet expectations. Most importantly, the Kankoyo story confirms the view that mining is an inherently polluting investment.

6.2 Mining: an inherent environmental cost- experiences

The people of Kankoyo have for so many years suffered from air, water and soil pollution. With Sulphur dioxide being the main polluting agent among many others, this has posed a severe impact on the enjoyment of nature and negatively affected the health of the local people. For the workers, having to face a polluted environment both at home and in the work place appears to be a 'double' tragedy. The problem for this working class community is complicated by environmental disasters that have happened in the recent past. Apart from water pollution which causes a lot of discomfort to the people, access to clean water is another major problem.

This study shows that many people in Kankoyo do not have access to clean water mainly due to (a) blocked pipes which have not been changed for many decades, (b) disconnections for failing to settle bills with the water utility companies. This has forced a number of residents to seek illegal means of accessing water by breaking water pipes that supply the Township. The problem with this is that the water is usually contaminated by dust and hence a health risk to the people. In addition to these experiences, is the constant fear of a potential environmental disaster like the previous 2014 acid leak (see findings chapters). The 2014 acid plant gas leak led to the death of at least two people and left many intoxicated. Further, the housing situation complicates the environmental experience (discussed later). These findings emphasises two main issues necessary for an understanding of capitalist investments. First the findings confirm the view that mining is inherently polluting. Secondly, it reveals the horrifying experiences of the working community and confirms the view that profit and wealth is the only and main goal for capitalism.

The extent of air, water, land pollution and its effects on the general environment in Kankoyo confirm the view that mining is inherently polluting (Bridge, 2004; Simukanga, 1999). The accounts given by the working class community confirm the view that environmental experiences of the working class communities are not just unique to Kankoyo Township. As other studies have shown (Dennis et al., 1956; Madihlaba, 2004; Nash, 1993; Nyandu, 2004; Singer, 2010), the primary concern for capitalists is profit and not the welfare of the workers. In this sense it appears that exploitation of workers binds workers to capital. The role of the worker as Dennis et al. (1956) argues is to make himself available for work and for the reproduction of labour

needed for the forward momentum of capitalism. In this situation, the worker and the environment are secondary to the profit and growth objective (Foster, 2009; Harvey, 2014; Magdoff & Foster, 2011)

The withdrawal of social services such as those to do with taking care of the environment in the mine Townships; refusal through trade agreements to take care of past environmental liabilities such as slag dams and leach plants; as well as the refusal to take care of present pollution through deceit and denial confirm the profit motive within the mining capitalism. Critiques have argued that for many years, capitalism has treated nature as an infinite reservoir of natural resources to be exploited for raw materials and energy sources. Nature has been seen as a bottomless sink capable of absorbing unlimited industrial and consumer waste (Cock, 2007; Harvey, 2014; Magdoff & Foster, 2011; Williams, 2014). Yet as Altvater (2006) posits "at the centre of the analysis of capitalism's relation to nature is the inherent and unavoidable dependence on natural resources (p. 39). In Kankoyo the current state of affairs confirms the continued exploitation of natural resources and the contamination of the earth through pollution, and waste arising from consumption and production. This form of exploitation takes the form of 'extractivism' broadly defined as activities which remove great quantities of natural resources that are not then processed (or done so in a limited fashion) and that leave a country as exports (Gudynas in Boron, 2015, p. 2).

The responses of the participants in this study show a growing consciousness among the residents of this exploitation of natural resources. As a result, a lot of the respondents fear that the cessation of mining activities in Kankoyo will result in severe economic hardships for many. On the other hand, some people fear that the rate at which copper is mined may lead to a faster extinction of the mineral resources underground. This will mean that people will suffer from the environmental impacts long after the mine is closed. To them this increases the urgency to benefit from mining. It is this category of people that believe in militant environmental activism.

6.3 Social Recognition: Risk perception and understanding

This study shows that the understanding of risky situations among the residents of Kankoyo is very poor. For example risky areas such as slug dams, dust and water that come from the mines were often taken as normal environments. This is because adults and children walked and played in these places without being worried about the health impacts. At the same time these understandings were conflicting and confusing. This is because some members were of the view that when the slag is released from the mines it is less harmful. They assumed that it would have been treated. While others argued that the slug was the major cause of the pollution that has led to respiratory, eye and other infections among the residents. The main conclusion is that people have an implied understanding (through physical experiences) of the dangers of the externalised costs of mining but lack the explicit (knowledge) understanding.

The different ways of understanding a risky environment included:

a) The physical experiences i.e. the chocking smoke, dust, corroded roofing sheets, and washed away paint and the bitter taste in the polluted water. To these people even if they did not know the actual polluting agents, they were sure that some dangerous chemicals were behind these processes.

b) The behaviour of the company during an emergency was another indicator of a risky situation. This group was of the view that if the company brought in emergency medical equipment and medications, then they were faced with a risky situation.

c) This group of people were able to identify a number of things in their surrounding as being contaminated e.g. slug dams, leach plants etc. But were not clear about the exact impact this could have on their health and environment. They were also not sure about the chemical elements contained in their observed risky environment.

d) This group which comprised mostly women, was of the view that everything in Kankoyo was contaminated and that they survived only by

> the grace of God. This claim was in their view justified by the many different diseases that people of Kankoyo suffer from. Examples include respiratory infections (Tuberculosis, Silicosis, bronchitis, Asthma etc.), eye infections, diarrhoeal diseases, skin and other unknown long term illnesses.

As a result, despite the general discourse and complaints about the environmental problems there is a palpable confusion and inadequate understanding of what constitutes a risky environment. This has led a number of people who are not sure about the long term impacts to conclude that relocating to a place without pollution may be fatal. They justified this by saying that they had become accustomed to the pollution. Others argued that the long term exposure have caused enormous health problems which even the medical staff have failed to diagnose. The only way for them was to wait for their death. In accounting for this variety in understanding and confusion, this study identifies three main factors as being responsible. These include: the invisibility problem, economic and acceptance.

6.3.1 The invisibility problem

This study shows that the people of Kankoyo were able to relate their suffering to the pollution from the mines. Mazur (1991) cited in Auyero & Swistun (2008, p. 7) explains that social recognition begins to happen when people begin to make the connections between their place of residence and the existence of certain illnesses, between illness and toxic hazards, and between their individual problems and those of others. This was evident through the complaints that all the residents and workers living in Kankoyo submitted. Despite this knowledge what is referred to as ‘implied understanding’ in this study, most people were not away of the long term effects and actual pollutants in the environmental costs in their surroundings. This situation is problematic in a number of ways:

First, it makes it difficult for the affected people to make any clear judgment on how fatal environmental costs may be for the further continuous expansion of capital (Harvey, 2014). Arising from this it prevents the necessary mobilization of a mass movement against externalization of environmental costs. People fail to see for example, that their exposure to pollution is a denial of human rights. Yet framing environmental experiences as justice issues as proved to be a pragmatic and coordinated way of environmental activism towards a mass movement for social change (Lukey, 2004, p. 286). The failure to respond by the Kankoyo community to their polluted environment attests to this claim. The residents of Kankoyo only respond to pollution when it becomes intolerable.

Yet, the damage that happens during the periods of their so called 'normal' emissions goes by ever so silently. The actual long term effects remain unknown and undocumented. These experiences are similar to studies in other places. In Flammable an Argentine Township, during the seventy-year period in which health-threatening pollution incubated in the neighbourhood, neither a major industrial accident nor a sudden discovery of a disease cluster ever disrupted daily routines" (Auyero & Swistun, 2008, p. 10).

This silent damage has been described in different ways, some have called it 'slow violence' (Nixon, 2011), as 'structural violence' (Goltung, 1969) and a 'risky society' (Beck, 2000) . This is the damage that passes by ever so silently, unseen and well-hidden. Yet it is a violence of delayed destruction. It is dispersed across time and space and it is an attritional violence that is not seen as violence at all (Nixon, 2011, p. 2). Therefore, for as long as there is no dramatic emission that disturbs the lives of the residents of Kankoyo, the potential harm to their lives caused by daily emissions will remain unnoticed. This study thus enriches Auyero & Swistun's (2008), findings that uninterrupted routines and interactions work smoothly as blinders to increasing environmental hazards. While people are able to express their frustrations as per this study, they have been reluctant to mobilise against the company in an organised way. Part of the explanation for this reluctance lies in the economic obstacle.

6.3.2 The economic obstacle: Prioritising economic gain over long term health risks

From the above findings the extent to which people express their frustrations with the pollution and inadequate state responses to address this problem is very clear. It shows the many real problems and horrifying experiences that people face. However, they find themselves trapped in a helpless position of choosing between the economic benefits that arise from the continued operation of the mines (through employment and state revenue) or enduring a contaminated environment. The economic benefit derived through the wage acts as a blinder to social recognition and leads to ignoring the facts of the environmental impacts. Most of the residents and employees living in Kankoyo acknowledge the importance of mining to themselves, their families and the community in general. This recognition of the economic importance of mining and the intension to minimise the negative impacts of mining is historical.

In the 1970s a mine disaster at Mufulira mine claimed 89 lives due to a rock fall caused mainly by negligence by the company. This raised significant health concerns from the mining experts who advised that the mine be closed. Yet the residents protested against the closure of the mine (Billany, 1977). This was despite the danger that the mine posed to the mine workers at the time. Forty years later, the people of Kankoyo still prioritise economic benefits over the long term. What accounts for this? There are three ways of responding to this question. First is the dependency on paid work as a means of survival by the local community. Second is related to the increasing poverty, unemployment and informalisation. Thirdly, the people have no option but to accept their situation in the absence of adequate laws to protect them against pollution. Added to this, is the absence of strong organisations (trade unions, environmental organisations), lack of education campaigns (absence of explicit understanding), and a pro-capital government.

6.3.2.1 Dependency on work for survival

> The opening of new mines in Northern Rhodesia required adequate and constant supply of labour. Therefore, there was need by mining companies to transform the existing pre-capitalist social formations and by making them subservient to capitalist production. This required measures that limited the possibilities for wealth accumulation by the natives through independent

commodity production and creation of worker dependence on the employer as the sole provider of wages and other social services (Cliffe1979, 151). Nash (1993) argues that this alienation from the means of production forces people to sustain even the most brutal attacks. It also leads to dependency and exploitation (, p. 330).

Thus proletarianization and imposition of taxes were the means by which natives were incorporated into the capitalist system. In addition, mining companies adopted corporate approaches that ensured the recruitment and retention of workers through the provision of social services. For example, Between 1948 and 1964 100, 000 houses were built by mining companies for Africans including recreational and sporting amenities and welfare facilities in addition to roads, power stations, hospitals, and schools (Cunningham, 1981; Ferguson, 1999). After independence this continued through the provision of education to miners' children, subsidised housing and food, electricity, water, transport and burial costs for the dead, road maintenance, refuse collection, cafeterias, bars and social clubs, and youth development schemes (Fraser & Lungu, 2007, p. 7-8).

Therefore, this historical account explains why the people of Kankoyo Township still remain committed to working in the mines for their survival. This is because the miners were integrated into the capitalist system as wage earners rather than as entrepreneurs. While women have been integrated as supporters of the male to support industrial production (Parpart, 1986). Secondly, the provision of housing and all required social services over time entrenched the view that work was the only way through which people could live. This explains the frustrations and disappointments with privatisation that this study reveals.

This study argues that the way in which labour was integrated in mining capitalism as labourers, and the provision of social services, firmly entrenched the dependency on paid work that we see in Kankoyo today. The study further argues that this dependence on the socio-economic benefits from the mine prevented the full realisation of the long term environmental degradation that

has taken place since the inception of mining. Therefore, the withdrawal of the social services after privatisation uncovered the veil around mining and the environment. In this way revealing what lay behind the spectacular benefits of free education, health, refuse collection and entertainment provided by the mining company. We are now face to face with the environmental reality behind mining operations.

6.3.2.2 Poverty, unemployment and casualisation of work

The high poverty, unemployment and informal work in Kankoyo have increased the vulnerability of this working class community to environmental costs of mining. As Mususa' study on the informal workers and women working on the slug dams in Luanshya in Zambia demonstrate, people are prepared to sacrifice their lives in order to escape poverty. People find themselves in a situation in which the need to fight poverty or survival conflicts with the negative health impacts caused by the externalised costs of mining (Mususa et al., 2010, p. 197).

The Kankoyo findings differ with the Luanshya findings only in small ways but have the same fundamental goal, to escape poverty. The Kankoyo story involves the working people and the unemployed. While the Luanshya experience involve people in the informal sector contesting illegality through the re-mining of slug dams which also negatively affects their health but which they don't mind. It involves an entrepreneurial response to poverty and unemployment. The Kankoyo experience is exposure without choice and the pollution emanates from past, present and ongoing pollution. While the Luanshya pollution is based on past mining activities. However, the fundamental issue that binds both studies is that the desire to escape poverty, subject poor people to environmental danger. In addition, in both cases the people are prepared to ignore the danger in preference for economic survival.

These findings show that: (a) privatisation and the resultant contraction of employment opportunities has forced (previously excluded) people such as women and children into the informal sector (Mususa et al., 2010); and (b) it has also increased the vulnerability of the working class communities and people that are still in formal employment to environmental suffering. As this study shows, the fear of losing employment and falling into poverty forces people to accept harsh environmental conditions and to sacrifice their health and life. As a consequence, the only way of survival is to minimise the environmental experiences through different coping mechanism as a way of enduring the toxic danger. Therefore, the Kankoyo findings fit in the Gramscian concept of 'dual' consciousness among the poor and exploited members of a capitalist society. To some extent they are taken in by attempts to legitimate the capitalist system but to some extent they also see through that system. These findings confirm the view that economic benefits shape the people's ability for social recognition and social action (Auyero & Swistun, 2008).

6.3.2.3 Acceptance as an obstacle to social recognition

This study indicates that the pollution problem has been accepted as an inevitable and acceptable activity for a mine Township. People now accept that there is a normal level of emissions that can sustain life. Some of the people interviewed were born there and now work in the mines and they have been through that environment. The working class community in Kankoyo finds itself in a dilemma which binds them to a company that destroys their environment. Yet they can do nothing but to accept their situation. These social relations of power influence what people should ignore, know, and misrecognize which in turn shapes locals' experiences of contamination and risk. In the end, poor people accept deadly subordination because of the differences in power relationships (Auyero & Swistun, 2008, p. 11).

6.4 Corporate policy on housing: outcomes

Kankoyo Township can be described by the prevalence of severe poverty, infrastructure deterioration, dilapidated housing, absence of street lighting, open and overflowing sewers. In addition, the roads are badly damaged due to the constant traffic, especially trucks carrying copper and cobalt to and from the Mopani site. The housing situation is characterized by severely cracked and falling houses due to blasting, and corroded roofing, washed away paint sulphur dioxide pollution.

Yet within these houses are homes for the people who work for one of the biggest mine in Africa. These broken houses are homes for the retrenched miners, the elderly, the young, the sick and disabled. The experience of Kankoyo experience thus fits the definition case of 'resource curse' in which the extraction and exploitation of a country's abundant natural resources result in under- development and impoverishment of the owners of the resources (Bush, 2010; Shaxson, 2007). Shaxson (2007) argues that mineral dependent countries have a tendency to fail to harness their resources for national development and even to be harmed by them in many cases (p. 1123). Bush (2010) adds that while financial resources go to foreign owners the nearby townships remain in poverty and misery. The Kankoyo findings provide sufficient evidence of the failure of the long held corporate policy on housing that has required that houses be built near the mine plants.

Existing literature shows that from the 1930s onwards, in order to address the problem of labour shortage, to stabilize the workforce near production sites, and to make it more productive, mining companies built housing estates and social infrastructure allowing them to take charge of, and control, the lives of the workers and their families (Cunningham, 1981; Klepper, 1979; Mwendapole, 1977; Parpart, 1986). This policy, which contributed to making these workers part of a relatively privileged social category, continued into the 1980s and was completely abandoned after privatisation. Despite this policy being abandoned after privatisation most of mineworkers still live in the same Townships because of the proximity to the mines. In addition due to inadequate incomes from the low wages that most mine workers get they are forced to live within the radius of the mine.

Experiences in other places demonstrate that the corporate policy on housing adopted by mining companies over the years has only served to increase the vulnerability of the working class communities to serious environmental danger (Madihlaba, 2004; Nash, 1993; Singer, 2010). Therefore, while this corporate approach has since the 1930s helped to address the problem of labour shortage, to stabilize the workforce near production sites, and to make it more productive, and allowed mining companies take charge of, and control, the lives of the workers and their families it has created severe environmental problems for the workers. As a result of the above experiences the lives of the people of Kankoyo have been transformed in many different ways.

6.5 Social transformation, claims and responses

The long term experience with environmental costs has transformed life in Kankoyo and brought different claims and responses. There are three ways of understanding the social changes in Kankoyo Township arising from their experiences with a polluted environment. These include (a) the responses or coping mechanisms to the polluted environment (b) the arising claims from these experiences and (c) the class and gender impacts.

6.5.1 Coping mechanisms

A large number of respondents explained that when they feel overwhelmed by the emissions. In order to cope, they usually take short breaks by visiting relatives in other places where there is no pollution. In escaping the pollution, some people have become seasonal migrants. Yet many others experience life as punishment from the company that ensures their economic survival. Nixon (2011) describes this as 'displacement in place', a situation whereby people feel as if they have been displaced within the place in which they live. However, escaping also had its own limits for those who do not have relatives to go to or are reluctant to accept them and for the workers who because of work have no time to escape.

Others have adopted measures aimed at withstanding the pollution. These include acts such as use of wet clothes to cover faces, closing the windows during emissions and constant watering of the yards to keep the dust down. In

terms of accessing water, people have resorted to illegal means of accessing water by breaking pipes that supply water to the Township. The third response is one that has left people to adjust to the existing environment. To this effect, a number of residents have developed significantly high levels of tolerance to the pollution. These measures confirm the ways in which the affected people are forced to accept their pervasive environment (Auyero & Swistun, 2008; Nixon, 2011). The adoption of these coping mechanisms does not however, prevent them from making claims.

6.5.2 Claims

The claims are mainly compensatory for the pollution suffered. These include: benefits such as free water and electricity, employment opportunities, education scholarships, health care and relocation. The claims have been justified on grounds that it will provide relief for the pollution suffered. Secondly, they feel that by virtue of living in the area where minerals are mined they should be entitled to the benefits. Thirdly, it was argued by the workers, that such provisions are necessary from a company that cared for the health of its workers who keep the mine going. The problem however, has been that due to the absence of an organised team or leadership to drive the struggle. As a result the claims have not been presented in an organised way to government and Mopani. While relocation has been proposed by the government it remains unimplemented due to as respondents argued, lack of political will.

These claims take a new dimension from the claims that have historically been made by the people in the mining towns in Zambia. Traditionally the claims were based on struggles against exploitation mainly in the work place, the inequitable distribution of the revenue generated by their hazardous labour, and the importance of this labour in the copper mining industry and, through it, national development (Larmer, 2006, p. 295). In addition, to these were claims for decent jobs in the mines (Burawoy, 1972; Larmer, 2007).

Secondly, claims have been made by local people who feel entitled to the benefits of mining by virtue of having mining investments in the area (Negi,

2013, p. 246). The newness of the claims arising from Kankoyo is in the fact previously, the local people made claims from a position of power. As a result, they were able to influence change through the process of claim making and even led to political change in the 1990s. However, the present Kankoyo claims are being made by very vulnerable who see the main polluter as their main source of income and livelihood. It is for this reason that if nothing is done to mitigate the impact of environmental costs of mining on this area, Kankoyo is indeed a bomb waiting to explode.

6.5.3 Class politics

Three class divisions define the Kankoyo community. The first class consists of Mopani employees with permanent and pensionable jobs as well as other public service workers in the area. The second involves the contract employees working in Mopani. These work on short term contracts and are paid relatively lower wages and poorer work conditions compared to Mopani employees. The third category consists of the unemployed youths, women, retrenched and retired mine workers, the aged, and children.

However, participation in the protests has made more visible these class divisions in the community. The community of Kankoyo is divided between those who work and those who don't. The working class are reluctant to participate in the protests for a number of reasons. These include: (a) the fear of losing employment if seen in the protests; (b) long working hours which leave them too tired to take part in the protests; (c) absence of a common mobilising platform as they work in different work stations; and (d) inadequate time to discuss environmental issues during working hours as they dedicate most of their time at work to production. In addition, those who are employed are able to afford to pay for water and electricity while the unemployed face disconnections. This has become another point that has led to conflicts and at same time widening the class divide within a poor community.

6.5.4 Gender and the environment

The environmental impacts of mining in Kankoyo have made gender more visible in two main ways. First, it has forced many women to seek informal activities through the sale of vegetables, dry fish, fruits and vegetables. During the times of male employment in the mines married women were mainly involved in supporting their husbands and not necessarily to seek informal work as the case is at the moment. Parpart (1986) records incidences in which due to greed of their husbands married women engaged in other activities to supplement their incomes. As Mususa etal (2010) argues women and children have stepped in as bread winners and house hold heads.

Secondly, as the environmental suffering takes a gender dimension, women appear to suffer more than the men to the effects of pollution in their community. This is due to the fact that women are involved in various household works. For example, drawing water and watering the yards to keep the dust down, caring for the sick, parenting, roles as wives and many other responsibilities. Most women complained that they spent most of their time drawing water to keep the mine dust down. In many cases, this was complicated by the difficulties in accessing water. The study therefore shows the extent to which male domination still find expression in today's society. Historically, men developed weapons to assert male dominance and to denigrate and restrict women to passive and subordinate roles (Banner et al., 1971). The end result is a situation in which women are more or less effectively excluded from access to the vital economic resources and political positions of their society.

As Bujra (1977) notes in Kenya's Atu that he examined, "in formal sense women in Atu are mere chattels and dependents of men and men accordingly speak of them in manner of contemptuous dismissal. Only men know what is right and sensible (Bujra, 1977, p. 14). Parpart (1986) argues that during the colonial period, western gender stereotypes combined with patriarchal traditions to reduce female power and autonomy. These gender roles in the case of Kankoyo translate into enormous responsibility and stress on the

women of Kankoyo. However, by engaging in income generating activities, the women of Kankoyo are now contesting these historical stereotypes.

6.6 Environmental activism

This study shows that environmental activism in Kankoyo can be understood through the different roles played by the union, environmental organisations, community and the state.

6.6.1 Trade unions

The helplessness of the working class community to fight pollution is complicated by absence of trade unions in environmental struggles. Trade union leaders in the area are of the view that environmental struggles are beyond the trade union mandate. The unions also identify the multiplicity and fragmentation of trade unions as a problem that has weakened their capacity to engage on other issues beyond wages. The union thus find itself in a struggle for membership, legitimacy and survival for which wage issues are seen as key. The absence of trade unions in environmental struggles has led the workers to avoid involving the unions in such matters. The workers generally feel that the union has become too weak even when negotiating the wages and conditions of service to be involved in environmental issues.

Therefore, the Kankoyo findings reveal two things about labour in Zambia. The first is that, they have remained organisations fighting for worker's rights in the factory walls (Rathzel & Uzzel, 2013). Trade unions in the mines can thus be classified as economic unions that are concerned only with workplace issues and not with anything beyond the work place (Devan Pillay, 2013). The danger with this kind of trade unionism is that the labour movement becomes isolated from other organisations. In this way, they lose the solidarity of other social movements in their struggles that may be very important to their workplace struggles (Bieler, Lindberg, & Pillay, 2008).

In this sense, they have abandoned the roles they played in the Townships in the 1940s and 1950s as they fought for improved living conditions (Mwendapole, 1977). Second, it confirms the view of others that trade unions in Zambia are weak (Bates, 1971; Burawoy, 1972; Mwendapole, 1977). The fear of employees to engage in community struggles against their employer and the reluctance of the trade union to take up this role complicates their vulnerability. But more importantly, it confirms the view that mining development is 'labour weakening'.

6.6.2 Environmental organisations

Environmental organisations in Kankoyo can be described as very weak and exist in name only. This weakness in environmental organisations has denied the community the ability to present their demands in an organised way. The prominent organisation in the area is Green Justice. The community members have wanted a militant environmental organisation. Yet Green Justice emphasizes dialogue, minimising pollution and disciplining the community against violent protests. The organisation recognises the economic importance of the mine to the community. For this reason, it advocates for what they called 'a win- win' situation including a bit of sacrifice to keep the mine operations going.

As a result, Green Justice finds it more convenient to cooperate with the mining company and not the trade unions on environmental issues. The challenges faced by the environmental organisations include: lack of finance, office space, and state intimidation among others. Because of these challenges environmental organisations working in Kankoyo face problems of acceptance and support from the community. It is on this basis that the environmental organisations are regarded as being corrupt and always siding with the polluting company.

6.6.3 Community responses

This study shows that the people involved in environmental activism are mainly the unemployed youth. The women were also reported to have staged a demonstration at the Mopani offices in the years before but this did not go beyond that. Environmental activism is reactionary and specific to air pollution that is considered abnormal. The protests are directed at the mining company and the state police. The recent protests in 2014 were triggered by two factors. (a) The decision by the company to ban the youths from re-mining and wire fencing of the slug dam that lies adjacent to the Township. This is because re-mining the slug dam served as a source of income for many unemployed youths before the ban. (b) The abnormal emissions of Sulphur trioxide which led to the death of two people. The youths argued that it was unfair for the company to cut their source of income when it was poisoning their compounds and killing people.

However this youth led activism is also problematic. The acts of stealing from the company during the protests by some youths render the protestors as thieves. This means that when they are caught by the police, what comes out on the news is that thieves broke into the mine. In the end, the struggle against the pollution is undermined or even unreported. The behaviour of the youths fit in many respects in Standing's (2011) definition of the precariat as a dangerous class. From their responses, the youths argued that given their helplessness in the face of a polluting mine they had nothing to lose by destroying the acid plant. In their view, if they destroyed, the acid plant then the company can act. Therefore, this study shows that despite the many problems, the community of Kankoyo has not responded to the pervasive environment they suffer in an organised way.

6.6.4 The state

The attitude towards environmental impacts of mining by the state through the councillor who participated in the study was one of denial, mitigating and adapting to the environmental problems. From the point of view of the area councillor the pollution problem is slowly improving and that with time the problem will soon be resolved. According to the councillor, there was need to give the mining company more time before changes in society can begin to happen. This was reflected in responses by the state police during the protest. The youths who have participated in the protests have been brutally beaten and detained. These violent responses have discouraged future protests in Kankoyo.

The core conclusion is that the state's goal is to protect the mining firm in order to safe guard government revenue through taxes, royalties and rent seeking activities. The Kankoyo experience is thus not a new phenomenon in mining capitalism. Regardless of the environmental impact, Argentina is protecting open pit mining allowing the destruction of glaciers and allow greater soy production in its agriculture, while Brasilia is allowing the deforestation of the Amazon and promoting the construction of huge dams that will end up destroying the vital oxygen producing lungs of planet Earth (Boron, 2015, p. 2).

Therefore, investments in mining and expansion are supported by weak environmental controls, relaxing labour laws and increase government rhetoric that publicize the benefit of these policies. Yet fail to quantify the immense environmental costs i.e. pollution, degradation of arable land etc. arising from that increased growth and expansion. In addition attracting foreign investment has led to the provision of favorable tax regimes, concessions and long stability periods, exemptions from tariffs and customs duties and free transfer of profits (Boron, 2015; Bush, 2010; Fraser & Lungu, 2007; Haglund, 2008)

6.7 Privatisation and the environment

There are two ways for understanding the relationship between the privatisation and the environment in Kankoyo. The first is that the contraction of the workforce, growth of unemployment and the informal sector has increased the vulnerability of the workers (people) to environmental suffering. The second is that the trade agreements following privatisation removed the legal protection necessary to safeguard the environment and hence the lives of the people living in the nearby Townships.

This study shows that in order to safe guard their jobs the mine workers in Kankoyo are not prepared to: (a) engage in environmental struggles in their community even when there is an emergency; (b) they could not bring this discussion at the work place even though they know that pollution comes from their employing company and ;(c) they were unable to challenge the pervasive work environment in their own work place either as individuals, groups or through their unions. In addition, the study shows that the major hindrance to community mobilisation was the contractual nature of the trade agreements. The participant feel frustrated that even if they took Mopani to the court, they will not succeed because the law in their view protects the company from litigation. As Fraser (2010) argues the privatisation agreements had a highly unusual legal status, only otherwise accorded to the Zambian Constitution. They could not in theory be contradicted by future legislation, as "stability clauses" ensured the policies in place when agreements were made could not be changed for between 15 and 20 years (p. 15).

It follows therefore, that the weak environmental laws implemented by government led to the worsening of the environmental conditions for the people in the nearby Townships. Second given the helplessness that people find themselves in because of their dependence on the mines they have failed to respond to the polluting company in an organised way. Instead they have decided to adopt coping mechanisms that are aimed not at challenging the polluting company but perpetuate their status quo. Therefore, as other authors (Dennis et al., 1956; Madihlaba, 2004; Nash, 1993; Nyandu, 2004) have observed, the environmental reality of a miner worker appears to be a double tragedy.

6.8 Chapter conclusion

This study shows that mineral resource development in Zambia has failed to deliver the better life that most local people expected it would. Instead, it has led to devastating environmental impacts on the nearby communities. The people of Kankoyo have for so many years suffered from air, water and soil pollution. Sulphur dioxide is the main polluting agent among many others. This has posed a severe impact on the enjoyment of nature and negatively affected the health of the local people. This has led to different health problems such as respiratory, skin, eye diseases and general health complications, and increased fear and anxiety for impending unknown disaster among the residents of Kankoyo. For the workers, having to face a polluted environment both at home and in the work place appears to be a 'double' tragedy. The problem for this working class community is complicated by environmental disasters that have happened in the recent past. The lack of access to clean water brought about by privatisation of the water utility has further complicated people's environmental experiences.

Despite these problems, this study acknowledges the continued economic importance of mining through state revenue and employment opportunities to ever decreasing available jobs in the mines. Northern Rhodesia (now Zambia) was mainly built around mining and that from then; the country has almost completely depended on mining. Mining can then be said to have established a country called Zambia and most of the roads, railways and other infrastructure came about due to mining. In addition, many people benefitted from social services such as free education, health and housing among others.

However, the often overlooked effect of these mining activities has been the impact it has had on the environment in the nearby Townships. To understand these issues required an approach that brought the economy, society and the environment into conversation. This was done through an eco-Marxist approach. In this way, the relationship between the economic activities (mining) and the social impacts (poverty, social transformations on class and gender etc.) as well as the environmental experiences are highlighted. This study therefore, argues that the provision of services and housing to the mine workers, and revenue to the government in the name of developing the country has been detrimental to the environment. This is because it diverted attention from the long term and ongoing environmental degradation that has

taken place overtime. This argument is based on the accumulated environmental costs such as; slug dams, the accumulated dust heaps, leach plants and long term environmental degradation in the mine Townships on the copperbelt.

These environmental impacts can be described in the words of one of respondents as an environmental disaster or a 'bomb waiting to explode'. The Kankoyo story confirms the view that mining is an inherently polluting investment. In addition, the findings provide sufficient evidence to argue that the relationship between mining, development and the environment is mired by inconsistencies, disappointments, inequalities and failures in the face of capitalist accumulation.

Secondly, this study shows that unfortunately, the understanding of risky situations among the residents of Kankoyo is very poor. For example risky areas such as slug dams, dust and water that come from the mines were often taken as normal environments in which adults and children walked and played without being worried about the health impacts. Yet for others, they feel that these sites are very risky to their health. The different ways of understanding a risky environment included: (a) the physical experiences i.e. the chocking smoke, dust, corroded roofing sheets, and washed away paint and the bitter taste in the polluted water. To these people even if they did not know the actual polluting agents, they were sure that some dangerous chemicals were behind these processes.

(b) The behaviour of the company during an emergency was another indicator of a risky situation. This group was of the view that if the company brought in emergency medical equipment and medications, then they were faced with a risky situation. (c) This group of people were able to identify a number of things in their surrounding as being contaminated e.g. slug dams, leach plants etc., but were not clear about the exact impact this could have on the environment and health. They were also not sure about the chemical elements contained in their observed risky environment. (d) This group which comprised mostly women, was of the view that everything in Kankoyo was contaminated and that they survived only by the grace of God.

The main conclusion is that people have an implied understanding (through physical experiences) of the dangers of the externalised costs of mining but lack the explicit (knowledge) understanding i.e. the present and long term effects. The problem with this lack of explicit knowledge is that it makes it difficult for the affected people to make

any clear judgment on how fatal environmental costs may be. Arising from this, it prevents the necessary mobilization of a mass movement against externalization of environmental costs. Secondly, it makes people to respond only when emissions are above what they have become used to. Yet, the damage that happens during the periods of their so called 'normal' emissions goes by ever so silently. The actual long term effects remain unknown and undocumented. In accounting for this variety in understandings and confusion, this study identifies three main factors as being responsible. These include: the invisibility problem (i.e. absence of immediate effects), economic (wages in order to escape poverty) and acceptance (given that there is no way out).

Thirdly, the study shows that inadequate understanding of the long-term problems, poverty, unemployment and casualisation has increased the vulnerability of the working class to externalised costs of mining. First, the economic benefit derived through the wage acts as a blinder to social recognition and leads to ignoring the facts of the environmental impacts. People are prepared to sacrifice their lives in order to escape poverty. The fears of loss of employment thus compel people to minimise their pervasive environmental experience. In this regard, they prioritise economic benefits over the long term health impacts. Secondly, the study confirms that the dependency on paid work as a means of survival by the local community has adverse environmental impacts. This emanates from the dependencies that were created at the inception of mining investments in the 1930s. Yet still find expression today. Thirdly, the people have no option but to accept their situation in the absence of adequate laws to protect them against pollution.

Fourth, the experiences with daily pollution have transformed the lives of the people of Kankoyo in many ways. First, the working class community in Kankoyo finds itself in a dilemma which binds them to a company that destroys their environment. This puts them in an awkward position in community struggles that require their participation. As a result, they get isolated yet they continue suffering from environmental costs both at work and in their community. Second, given the helplessness that people find themselves in, others have become seasonal migrants in search of fresh air. Some residents submitted that, they usually take short breaks by visiting relatives in other places where there is no pollution. Yet many others experience life as punishment from the company that ensures their economic survival.

For those who cannot move to other places, the only option is to use wet clothes to cover their faces, closing the windows during emissions and constant watering of the yards to keep the dust down. In terms of water people have resorted to illegal means of accessing water by breaking pipes that supply water to the Township. Their helplessness also shape the ways in which they frame their claims. Rather than making their claims as demands, claims appear as wishes and in many instances compensatory for the pollution suffered. This creates an impression that people need to be paid for their suffering. The people of Kankoyo demand free water and electricity not as a social justice demand but as a compensation for the pollution suffered.

In addition, as the environmental suffering takes a gender dimension, women appear to suffer more than the men to the effects of pollution in their community. This is due to the fact that women are involved in various household works. For example, drawing and watering the yards and keeping the dust down, caring for the sick, parenting, roles as wives and many other responsibilities. Most women complained that they spent most of their time drawing water to keep the mine dust down. In this way environmental suffering reveals the historical stereotypes that have asserted male dominance and to denigrate and restrict women to passive and subordinate roles.

Fifth, this study argues that corporate policy on housing has failed. The Kankoyo findings provide sufficient evidence of the failure of the long held corporate policy on housing that has required that houses be built near the mine plants. The policy helped to address the problem of labour shortage, to stabilize the workforce near production sites, and to make it more productive. It also allowed the mining companies to take charge of, and control, the lives of the workers and their families. In this way, the policy was not meant to address the welfare of the workers who sacrifice their lives to keep the mines going. This emphasises the labour and natural resource exploitation inherent in capitalist production. In addition, it reveals the inequalities associated with capitalism. Second, while the housing policy, contributed to making the mine workers part of a relatively privileged social category, it has turned out to be that, the mine workers now suffer the worst form of pollution.

Kankoyo Township can be described by the prevalence of severe poverty, infrastructure deterioration, dilapidated housing, absence of street lighting, open and overflowing sewers. In addition, the roads are badly damaged due to the constant traffic, especially trucks carrying copper and cobalt to and from the Mopani site. The housing situation is characterized by severely cracked and falling houses due to blasting, and corroded roofing, washed away paint sulphur dioxide pollution. Yet within these houses are homes for the people who work for one of the biggest mine in Africa. These broken houses are homes for the retrenched miners, the elderly, the young, the sick and disabled. The experience of Kankoyo experience thus fits the definition of 'resource curse' in which the extraction and exploitation of a country's abundant natural resources result in under- development and impoverishment of the owners of the resources.

Six, the major problem for the people has been that environmental activism is generally weak. As community members, the absence of the working class, coupled with lack of identifiable leadership to advance their struggles against pollution has severely weakened their struggles. Environmental struggles are thus left to the youths who have also failed to present their issues in an organised way. The absence of trade unions in the struggle has weakened the movement even further. Unions in Kankoyo have limited their functions to fighting for worker's rights only. In addition, the environmental organisations are weak and incapable of advancing the interest of the community. They lack finances, office space, partnerships, international linkages and community support.

Therefore, this study shows that despite the many problems, the community of Kankoyo has not responded to the pervasive environment they suffer in an organised way. For the state, their attitude towards environmental impacts of mining is was one of denial, mitigating and adapting to the environmental problems. This is reflected in the repressive tendencies and police brutality during environmental protests. The core conclusion is that the state's goal is to protect the mining firm in order to safe guard government revenue through taxes, royalties and rent seeking activities.

Further, the study also shows that privatisation agreements and there provisions on the environmental liability is a major obstacle to community mobilisation. Therefore, there are two ways for understanding the relationship between the privatisation and the environment in Kankoyo. The first is that the contraction of the workforce, growth of

unemployment and the informal sector has increased the vulnerability of the workers (people) to environmental suffering. The second is that the trade agreements following privatisation removed the legal protection necessary to safeguard the environment and hence the lives of the people living in the nearby Townships.

Despite all the above, the people of Kankoyo still have their hopes in the mine. Many of the people interviewed argued that the closure of the mine would be destructive. They have instead, opted for solutions to reduce the emissions or to find measures to help them cope. However, given the fact that mining is inherently polluting, only time will tell on how long this view holds. In the meantime mining has led to what appears as a 'development of environmental suffering'. This refers to a situation in which people are subjected to severe environmental suffering arising from industrial production yet they depend on it for their economic survival.

6.9 Recommendations

The Kankoyo findings key lessons are therefore that translating public concern for the impact of environmental costs of capitalist's production e.g. mining into effective action requires real knowledge. After all, one can correctly identify causes, yet still judge the risk to be moderate minimal or non-existent. The views of the affected people must be founded on strong understanding of the problem they face as their views, attitudes and actions are important in addressing the problems of externalised costs, be it policy influence, social action or civil society mobilisation. Failure to take public values and views into consideration when taking decisions on dealing with environmental cost problem by the government, capital or civil society organisations will inevitably prove problematic, for several reasons. At a basic level, such actions will require a degree of 'buy-in' or acceptance from those who will be affected by them if they are to be successfully implemented. Second, where public policy and citizen frames of reference differ (e.g. regarding the balance between long-term and short-term considerations) the practice of risk communication becomes much more difficult. Policy implementation may be misunderstood, neglected or even opposed by the affected people.

Secondly, there is need to explore how environmental costs of mining specifically affect women and children given that they are the ones who are involved in the day to day running of their homes. Long-term health effects of environmental costs also need to be explored in order that the long term effects are recorded. In the meantime there is need for the labour movement and environmental organisations to work together in fighting for environmental protection. The aim should be to politicise the environmental question in order that it is highly publicised and made more visible.

Thirdly, there is need for government to implement policies that address the housing policy that requires workers to live near or inside that plant. This is because as this study and others have shown, this policy is problematic.

Fourth, government must ensure that when signing new trade agreements, the welfare of the local people is addressed. In this regard, there is need for all players, civil society, trade unions and political parties to bring the environmental issues high on the political agenda.

Fifth, there is need for government to renegotiate some of these trade agreements in order that the environmental concerns are addressed. Following to this, the government must strengthen the environmental management agency in Zambia by providing the material and financial resources required.

Finally, there is a need to relook at existing environmental laws with a view of addressing the problems and weaknesses identified. This should go as far as including environmental rights in the bill of rights currently in process.

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