

Exploring Community Perspectives on Environmental Degradation Caused by Mining: A Case Study of Mpika District, Zambia

Aaron Kachamba^{1*}, Wilson L. Phiri²

¹Master's Student, School of Social Sciences, Department of Social Development Studies, Mulungushi University, Kabwe, Zambia

²Lecturer School of Social Sciences, Department of Social Development Studies, Mulungushi University, Kabwe, Zambia

*Corresponding Author

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ABSTRACT

Background: Mining remains one of the major contributors to economic growth in many developing countries, particularly in sub-Saharan Africa. However, the expansion of mining activities has increasingly been associated with environmental degradation, public health concerns, and socio-economic disruptions affecting local communities.

Aim: To explore community perspectives on environmental degradation caused by mining activities in Mpika, Zambia, with particular attention to their effects on residents' health and livelihoods.

Methods: The study was guided by Environmental Justice Theory and employed a qualitative case study design. Purposive and Snowball non-random sampling methods were used to recruit 50 participants comprising 22 in-depth interview participants and 28 focus group discussion participants across three FGDs. Data were collected through in-depth interviews, focus group discussions, and community observations involving residents, local leaders, and other stakeholders. Qualitative data were analysed using Braun and Clarke's six step thematic analysis framework. Trustworthiness was enhanced through triangulation, member checking, and data saturation principles.

Findings: The findings indicate that community members perceive mining activities as major contributors to land degradation, water pollution, deforestation, dust emissions, declining agricultural productivity, and loss of biodiversity previously relied upon for food, medicine, and cultural practices. Participants further associated mining-related environmental degradation with respiratory illnesses, skin infections, unsafe drinking water, reduced household income, food insecurity, and growing social inequalities. The study also revealed that affected communities experience limited participation in environmental decision-making processes despite bearing disproportionate environmental burdens. The findings reinforce Environmental Justice Theory by demonstrating the unequal distribution of environmental risks and the marginalization of local voices in mining governance.

Conclusion: The study concludes that mining-related environmental degradation in Mpika has deepened social inequality, health vulnerabilities, and economic insecurity among local residents. The research recommends stronger environmental regulation, improved community participation in mining governance, enhanced corporate accountability, and sustainable environmental management practices to protect affected communities and promote environmental justice. This research contributes to existing scholarship by foregrounding local community experiences and advancing debates on sustainable and socially just mining practices in Zambia.

Keywords: Environmental Degradation, Mining, Community Perceptions, Environmental Justice, Health Impacts, Livelihoods.

BACKGROUND OF THE STUDY

Mining remains one of the most significant drivers of economic growth globally, particularly in developing economies rich in mineral resources. The sector contributes substantially to industrialization, employment creation, infrastructure development, and foreign exchange earnings. The increasing global demand for strategic minerals such as copper, cobalt, lithium, and nickel driven largely by renewable energy transitions and technological advancement has intensified mining activities across many regions of the world (International Energy Agency [IEA], 2023). Despite its economic significance, mining continues to generate serious environmental and social consequences, particularly in communities located near extraction sites. Contemporary evidence shows that mining-related environmental degradation has become a major sustainability challenge affecting ecosystems, public health, and rural livelihoods globally (United Nations Environment Programme [UNEP], 2022).

Environmental degradation associated with mining commonly includes land contamination, deforestation, biodiversity loss, soil erosion, water pollution, and air quality deterioration. These environmental changes frequently disrupt local livelihoods that depend on agriculture, fishing, forestry, and access to clean water resources (Sonter et al., 2021). Mining operations also generate toxic waste and heavy metal pollutants that may accumulate in soil and water systems, exposing surrounding populations to long-term health risks such as respiratory illnesses, skin diseases, reproductive disorders, and chronic infections (Bebbington et al., 2022). The World Health Organization (WHO) estimated that environmental pollution contributes significantly to the global disease burden, particularly among vulnerable populations residing in environmentally degraded areas (WHO, 2023). Consequently, global debates surrounding mining increasingly focus not only on economic productivity but also on environmental sustainability, community welfare, and social justice.

Studies from Latin America, Asia, and Africa demonstrate that mining communities frequently experience unequal exposure to environmental hazards while receiving limited socio-economic benefits from extractive activities. In countries such as Peru, Ghana, and the Democratic Republic of Congo, research has linked mining activities to declining agricultural productivity, contamination of drinking water sources, displacement of local populations, and increasing poverty among rural households (Mkodzongi & Spiegel, 2022). Similarly, evidence suggests that communities located near mining operations often experience exclusion from environmental governance and decision-making processes despite bearing the greatest environmental burdens (United Nations Development Programme [UNDP], 2022). Such patterns have raised international concern regarding the sustainability of extractive industries and the need for inclusive environmental governance frameworks that prioritize affected communities.

In sub-Saharan Africa, mining remains central to economic development and export generation in countries such as Zambia, South Africa, Botswana, Ghana, and the Democratic Republic of Congo. According to the African Development Bank (AfDB, 2023), the mining sector contributes substantially to national revenues and employment creation across the region. However, environmental regulation and enforcement mechanisms remain weak in many African mining economies, resulting in increasing cases of ecosystem destruction, water contamination, land degradation, and displacement of rural communities. UNEP (2022) further reports that many mining-dependent communities across sub-Saharan Africa continue to face limited access to safe water, declining soil productivity, and deteriorating environmental conditions associated with extractive operations. These environmental challenges disproportionately affect low-income rural populations whose livelihoods are heavily dependent on natural resources.

Zambia represents one of Africa's major mining economies, with copper and cobalt mining contributing significantly to national export earnings and economic growth. The mining sector accounts for a substantial proportion of Zambia's foreign exchange revenues and remains a key pillar of national development policy (Bank of Zambia, 2024). Nevertheless, environmental degradation linked to mining has emerged as an increasingly important public concern, particularly in communities located near mining operations. Reports from the Zambia Environmental Management Agency (ZEMA, 2023) indicate persistent cases of water pollution, soil contamination, air pollution, and ecosystem degradation in major mining regions, especially within the Copperbelt and North-Western Provinces. These environmental impacts continue to threaten agricultural productivity, food security, public health, and sustainable livelihoods among surrounding communities.

Recent studies in Zambia further reveal that mining-related environmental degradation disproportionately affects economically vulnerable rural populations. Chanda et al. (2023) found that residents living near mining areas frequently experience respiratory infections, skin irritations, contaminated water sources, and declining crop yields associated with environmental pollution. Similarly, Phiri and Mwanza (2022) observed that communities near mining operations report increasing concerns regarding deteriorating environmental quality, loss of productive land, and declining livelihood opportunities. In addition, Ng'andu and Mulenga (2021) reported growing perceptions among community members that mining companies often prioritize profit maximization over environmental protection and community welfare. Although Zambia has established environmental regulatory frameworks and environmental impact assessment procedures, enforcement limitations, weak institutional capacity, and inadequate community participation continue to undermine effective environmental governance (World Bank, 2023).

Despite growing literature on mining and environmental degradation in Zambia, much of the existing research has concentrated on quantitative assessments of pollution levels, economic contributions, and industrial productivity while paying limited attention to the lived experiences and perceptions of affected communities (Mwiinga, 2021). Consequently, there remains insufficient qualitative evidence explaining how residents in mining communities interpret environmental changes, experience associated health and socio-economic challenges, and respond to environmental degradation within their local contexts. This gap is particularly important because community perceptions influence local responses to environmental risks, trust in mining institutions, and participation in environmental governance processes.

The case of Mpika provides an important context for examining how mining-related environmental degradation affects local communities from the perspective of residents directly experiencing these environmental changes. Understanding community perspectives is essential for developing sustainable and socially responsive mining policies that balance economic development with environmental protection and human well-being. This study therefore seeks to explore residents' perceptions of environmental degradation caused by mining activities in Mpika and to examine the associated impacts on health and livelihoods. By foregrounding community voices and lived experiences, the study contributes to broader debates on environmental sustainability, community participation, and social justice within extractive industries.

The study is guided by Environmental Justice Theory, which argues that all communities, regardless of socio-economic status or geographic location, have equal rights to environmental protection, participation in environmental decision-making, and access to safe and healthy living conditions (Bullard, 1990). The theory is relevant to this study because mining-related environmental degradation often disproportionately affects marginalized rural populations that possess limited political influence and inadequate access to institutional protection mechanisms. Environmental Justice Theory emphasizes distributive justice, procedural justice, and recognition justice by highlighting the unequal distribution of environmental risks, the exclusion of affected communities from environmental governance processes, and the marginalization of local experiences and knowledge systems (Schlosberg, 2021; Walker, 2020). In the context of Mpika, the theory provides an appropriate analytical framework for understanding how residents perceive environmental degradation, health risks, livelihood disruptions, and their level of participation in environmental decision-making processes related to mining activities.

MATERIALS AND METHODS

Research design

The study adopted a qualitative research approach grounded in a case study design with an interpretivist paradigm. The study was informed by Environmental Justice Theory, which argues that everyone, regardless of race, ethnicity or socio-economic standing, has an equal right to a clean and healthy environment (Bullard, 1990). A case study research design in qualitative research emphasises interpretation of lived experience, recognising that meaning is co-constructed through social interaction and contextual understanding rather than merely described (Addeo, 2013; Qazi and Rashidi, 2018b). This design was appropriate for exploring the community perspectives on environmental degradation caused by mining in Mpika District, Zambia.

Study Site

The research was conducted among selected residents affected by mining activities in Mpika District, Muchinga Province, Zambia. Mpika District is a major agricultural and transportation hub covering 17,166 km². It is known for housing significant portions of North and South Luangwa National Parks, and acting as a junction on the Great North Road (Zambia Statistical Agency, 2022).

Target Population

The main study population comprised residents of selected communities in Mpika District. Creswell (2013:155) states that “It is essential that all participants have [similar lived] experience of the phenomenon being studied”. Thus, qualitative research aims to allow participants with similar experience to begin a process of reflection and engagement with the meaning of their personal experience of environmental degradation associated with mining activities in Mpika District (Biggerstaff and Thompson, 2008).

Sampling Methods

The goal of this study was not to recruit a representative sample, but rather to focus on participants who possessed similar characteristics that were relevant to the study (Creswell and Creswell, 2017). The researcher employed purposive and snowball non-random sampling methods in recruiting the participants for the study. These participants shared attributes and experiences relevant to the study phenomenon (Bryman, 2016). In this regard, purposive and Snowball sampling techniques were employed as features of qualitative research in order to enable the researchers to select knowledgeable participants.

Sample size

The sample size for this study was 50 participants. This sample size was considered sufficient once thematic saturation was achieved. In qualitative research, Smith and Osborn (2008) have advocated for a small sample size. This is because qualitative research is not aimed at making generalizations but having a holistic picture of the perspectives of people experiencing a similar phenomenon. Qualitative studies do not determine sample size statistically but seek information-rich participants and data saturation. As such, the commonality of their experiences was captured and interpreted. Thus in this study, the researchers conducted in-depth interviews, focus group discussions and observations with 50 participants as residents of Mpika District.

Data Collection Methods

This research employed in-depth interviews (IDIs), focus group discussions (FGDs), and observations to explore community perspectives on environmental degradation caused by mining in Mpika District, Zambia. Smith et al (2009) suggested that semi-structured interviews are well-suited to the task of capturing people’s lived experiences and through which a phenomenon could be interpreted in terms of the meanings interviewees bring to it. This type of interview was used to create a space in which the researcher and participants constructed the knowledge together (Birks and Mills, 2011). The interviews were conducted in participants’ preferred languages (i.e., English and Bemba). Each participant was identified by pseudo names which were different from the actual names of the participants. The researchers preferred the IDIs, FGDs, and observations because it enabled them to have more clarifying, probing, and cross-checking questions, where the interviewers have the freedom to alter; rephrase and add questions according to the nature of the responses from interviewees (Best and Kahn, 2003). The semi-structured interviews also provided an opportunity for recording all the responses from participants.

Data Analysis and Interpretation

Data was analysed using thematic analysis following Braun and Clarke’s (2006) six-step model. Braun and Clarke recommended that qualitative research focuses on the following steps, namely: familiarization with the data, generating initial codes; searching for themes; reviewing themes; defining and naming themes, and producing the report. In this study, interviews were recorded with the consent of the participants. The audios were then transcribed and uploaded into the qualitative research software called Nvivo version 12 pro to assist in organizing and coding data. Themes were interpreted through the lens of Environmental Justice Theory, which

guided the analysis of community experiences of environmental degradation, unequal exposure to environmental risks, and exclusion from environmental decision-making. The researchers read through the transcripts identifying open codes using the qualitative software Nvivo. Coding aided in identifying concepts, categories and sub-categories that were further broken down. Open coding involves reading the texts ‘word-by-word’, ‘line-by-line’, and repeatedly to identify phrases that interviewees were using to describe things and issues. The coded data was then categorised (grouped) according to different characteristics to better understand the data. The categories were then grouped to form sub-themes and then eventually, the sub-themes were grouped to come up with the main themes. This enabled the researcher to categorize items according to what description they offered (Bryman, 2012).

Reflexivity and Positionality

The principle of reflexivity means that the researcher should be conscious about his/her own position, values, biases and decision in constructing knowledge of the social world in the research process right from designing the tools, data collection and interpretation of the findings (Hesse-Biber and Johnson, 2015). As this was a qualitative study, the researchers were aware that their background, values, beliefs, and experiences could influence the research process (Floyd and Arthur, 2012). To overcome the problem of positionality, the researchers had put aside any preconceived ideas or what they may have personally observed about the lived experiences of community residents in Mpika District in line with the recommendations by Greenbanks (2003) that reflexivity requires explicit self-consciousness and self-assessment about the researchers’ views and positions and how these might influence the design, execution, and interpretation of research findings. Additionally, the primary researcher had professional experience in mining and community development. To minimise bias, reflexive journaling, peer debriefing and regular consultation with the supervisor were employed throughout data collection and analysis.

Ethical Considerations

In any research conducted, ethical issues must be taken into consideration by the researcher (Bryman, 2016). The researchers ensured that ethics of social research were upheld. The main ethical issues addressed in the course of the research were; approval, permission, access and acceptance, informed consent, confidentiality, right to privacy and anonymity, right to withdrawal, beneficence, justice and fairness. The ethical approval number for the study is MU/DRI/REC/2026/042.

Study Findings (Results)

Introduction

This section presents findings of the study on the community perspectives on environmental degradation caused by mining in Mpika District, Muchinga Province of Zambia. The findings are based on data generated through in-depth interviews (IDIs), focus group discussions (FGDs), and observations. Consistent with the case study research design, emphasis was placed on understanding how participants themselves experience, interpret, and respond to the environmental degradation caused by mining activities within their everyday community environments. Findings are presented thematically in line with the study objectives and research questions. The major themes that emerged include: (1) community perceptions of environmental changes caused by mining; and (2) the health and socio-economic impacts of mining-related environmental degradation.

Demographic Characteristics of Participants

The participant profile demonstrates broad representation across gender, age, livelihood categories, and duration of residence. The relatively balanced gender distribution enhanced the reliability of the findings by capturing gendered experiences of environmental degradation. Women frequently emphasized domestic burdens associated with water scarcity, caregiving responsibilities, and food insecurity, whereas men predominantly discussed declining agricultural productivity, land degradation, and economic instability.

Most participants belonged to the economically productive age category of 31-45 years. This group possessed extensive lived experience regarding changes in agricultural production, environmental conditions, and household livelihoods. Their accounts provided important insights into how environmental degradation intersects with economic survival and social vulnerability.

Long-term residency also strengthened the credibility of the findings. Nearly half of the participants had lived in Mpika for more than twenty-one years, enabling them to compare environmental conditions before and after intensified mining activities. These participants described substantial changes in vegetation cover, water quality, rainfall patterns, and agricultural productivity over time.

The predominance of farming as the main livelihood activity illustrates the community's dependence on natural resources. This dependence heightened community vulnerability because environmental degradation directly affected food production, household income, and livelihood security. The study included 22 participants in in-depth interviews and 28 participants across three focus group discussions. The demographic profile therefore confirms that participants possessed relevant experiential knowledge regarding environmental transformations occurring within Mpika as shown in the table 1 below.

Table 1: Demographic Profile of Participants (n=50)

Category	Sub-Category	Frequency
Gender	Male	26
	Female	24
Age Group	18-30 years	12
	31-45 years	21
	46-60 years	11
	61+ years	6
Length of residence in Mpika	0-10 years	8
	11-20 years	19
	21+ years	23
Main Livelihood	Farming	29
	Small business	11
	Casual mining labour	6
	Other	4
Data Collection Method	Individual Interviews	22
	FGD Men	9
	FGD Women	10
	FGD Youth/Elders	9

Specific codes and themes emerging from data

In line with the research design, the findings emphasized the importance of giving a voice to study participants. This approach is in line with the epistemological methods of understanding the social worlds based on the lived experiences of research participants.

Table 2: Emerging themes and sub-themes

Themes	Sub-themes
Community Perceptions of Environmental Changes Caused by Mining	Water Contamination and Growing Water Insecurity
	Soil Degradation and Declining Agricultural Productivity
	Air Pollution, Dust Exposure, and Psychological Distress

	Deforestation and Loss of Biodiversity
Health and Socio-Economic Impacts of Mining-Related Environmental Degradation	Respiratory Illnesses, Skin Diseases, and Unequal Health Burdens
	Food Insecurity and Livelihood Disruption
	Social Conflict, Exclusion, and Psychological Stress

Source: Field Data (2026)

Community Perceptions of Environmental Changes Caused by Mining

This section examined community perceptions regarding environmental changes resulting from mining activities. Participants consistently described mining operations as the principal driver of environmental decline within Mpika. Four sub-themes emerged from participants' responses: water contamination and growing water insecurity; soil degradation and declining agricultural productivity; air pollution, dust exposure, and psychological distress; and deforestation and loss of biodiversity.

Water Contamination and Growing Water Insecurity

Water contamination emerged as the most urgent environmental concern raised by participants. Residents explained that prior to the expansion of mining activities around 2014, rivers, streams, and shallow wells provided reliable sources of drinking water, irrigation, and domestic use. However, participants reported that these water sources had become increasingly polluted, discoloured, and unsafe for human consumption. One participant explained:

"We used to drink directly from the river. Now if you drink, your stomach runs for three days." (Participant 1, Farmer, 54 years)

Participants associated the contamination with chemical discharge, sediment deposition, and mining waste entering water systems upstream. Community members perceived the deterioration of water quality as evidence of institutional failure and regulatory neglect. Women were particularly affected because they bore responsibility for securing household water supplies. Many explained that they now travel long distances to access alternative water sources, increasing both physical labour and household expenditure.

The findings further suggest that water insecurity in Mpika extends beyond environmental deterioration to encompass issues of social injustice and unequal environmental protection. Participants believed that mining companies prioritized mineral extraction over community welfare, while government institutions failed to enforce environmental regulations effectively. Within the framework of Environmental Justice Theory, unequal exposure to contaminated water reflects broader patterns in which vulnerable communities disproportionately bear environmental risks while lacking the political power necessary to influence decision-making processes.

Participants also described growing fear regarding long-term health implications associated with contaminated water consumption. Several households reported increased incidences of stomach illnesses, diarrhoea, and skin irritation, which residents directly associated with polluted water sources. Consequently, water degradation was perceived not merely as ecological damage but as a direct threat to survival, dignity, and community wellbeing.

Soil Degradation and Declining Agricultural Productivity

Participants consistently linked mining activities to declining soil fertility and reduced agricultural productivity. Farmers explained that dust emissions, blasting residues, and chemical deposits had negatively affected crop performance and soil quality over time. Agricultural land previously regarded as fertile was now described as exhausted, infertile, and chemically damaged. One youth participant stated:

"We are eating, but we have fear. Your cassava is different." (Participant 6)

Participants explained that crops increasingly appeared unhealthy, stunted, or discoloured, raising fears regarding food safety and long-term health consequences. Several farmers estimated substantial reductions in maize production over the past decade, with yields reportedly declining from approximately twenty bags per lima in earlier years to between six and eight bags in recent seasons.

The decline in agricultural productivity significantly affected household food security and income generation because most families depended on farming as their primary livelihood source. Participants perceived the deterioration of agricultural land as evidence that mining operations were undermining long-term community sustainability in exchange for short-term economic extraction. The findings further demonstrate that environmental degradation in Mpika is experienced as cumulative and interconnected. Reduced soil fertility contributed directly to food insecurity, declining household income, and increasing dependency on unstable casual labour opportunities offered by mining operations. Environmental Justice Theory explains that environmental harm becomes particularly unjust when affected populations depend directly on natural resources for survival yet remain excluded from decisions governing resource exploitation.

Participants also expressed frustration that agricultural losses were rarely acknowledged by mining companies or state authorities. The absence of compensation mechanisms reinforced perceptions of marginalization and abandonment among affected households.

Air Pollution, Dust Exposure, and Psychological Distress

Air pollution resulting from blasting and mining-related dust emerged as another dominant concern among participants. Residents living near mining sites reported continuous exposure to red dust settling on houses, crops, household items, and water containers. One participant explained:

“Red dust is on everything when you wake up in the morning.” (Participant 11, 38 years)

Participants described dust pollution as unavoidable and persistent, particularly during dry seasons. Most interviewees associated prolonged dust exposure with respiratory illnesses, including chronic coughing, asthma, breathing difficulties, and chest pain. Children and elderly individuals were identified as the most vulnerable groups.

Blasting activities were also linked to excessive noise, ground vibrations, fear, and psychological stress. Parents explained that children often became frightened during blasting periods, while some households reported structural cracks in buildings caused by vibrations. Participants perceived dust suppression measures implemented by the mining company as temporary and performative rather than genuinely protective.

The findings reveal that environmental degradation in Mpika extends beyond physical pollution to include emotional and psychological suffering. Residents expressed frustration that their complaints were routinely ignored by both mining authorities and environmental regulators. Many believed that mining companies intensified dust control measures only during official inspections. This perception reflects broader concerns regarding weak environmental governance and limited accountability within extractive industries. Environmental Justice Theory emphasizes that environmental inequality is reinforced when affected communities lack meaningful participation in environmental decision-making and possess limited capacity to challenge harmful industrial practices.

Deforestation and Loss of Biodiversity

Participants further described widespread deforestation resulting from mining expansion and land clearing activities. Elderly residents recalled that the area previously contained dense forests rich in indigenous trees, medicinal plants, mushrooms, wild fruits, and wildlife species. However, these environmental resources were reportedly disappearing rapidly due to mining operations. One elderly participant explained:

“We will not have anything left - no more mushrooms, no more wild honey, or medicinal plants.” (Participant 14, 71 years)

Participants emphasized that forests previously supported household nutrition, traditional medicine, cultural practices, and intergenerational knowledge transmission. The destruction of these ecological resources was therefore perceived not only as environmental damage but also as cultural erosion. The findings indicate that biodiversity loss has weakened traditional coping systems that communities historically relied upon during periods of economic hardship or food shortages. Elderly participants expressed concern that younger generations would inherit degraded landscapes lacking the ecological resources that previously sustained community life.

Environmental Justice Theory recognizes that environmental rights extend beyond access to clean air and water to include the protection of cultural identity, ecological heritage, and community survival systems. In Mpika, participants viewed deforestation as symbolic of broader social exclusion in which economic interests were prioritized over local ecological and cultural wellbeing.

Health and Socio-Economic Impacts of Mining-Related Environmental Degradation

This section presents the results on the health and socio-economic impacts associated with mining-induced environmental degradation. Participants consistently described worsening health conditions, livelihood insecurity, food shortages, social tensions, and psychological distress linked to environmental decline.

Respiratory Illnesses, Skin Diseases, and Unequal Health Burdens

Participants consistently associated environmental pollution with increasing health complications within the community. Frequently reported conditions included chronic coughing, asthma, skin rashes, eye irritation, breathing difficulties, and persistent itching among children. One participant explained:

“My grandson itches so badly he scratches until he bleeds.” (Participant 2)

A local clinic worker confirmed that respiratory illnesses had increased significantly following intensified mining activities. Participants believed that prolonged exposure to contaminated water and airborne dust contributed directly to deteriorating health conditions.

Despite these growing health concerns, residents explained that healthcare services within the area remained inadequate. Participants reported shortages of medicines, limited medical personnel, and absence of specialists capable of diagnosing or treating mining-related illnesses. Consequently, households often relied on self-medication or traditional remedies. The findings reveal significant structural inequalities in environmental health protection. Although mining activities generated substantial economic benefits for external stakeholders, affected communities continued to experience environmental exposure without adequate healthcare support or compensation. Environmental Justice Theory explains that marginalized populations frequently experience disproportionate environmental and health burdens while receiving minimal institutional protection. Participants therefore perceived mining-related illness not simply as a medical problem but as evidence of social neglect and unequal citizenship.

Food Insecurity and Livelihood Disruption

The study further found that environmental degradation had severely undermined household livelihoods and food security. Declining agricultural productivity reduced household food availability and weakened local economic stability. Participants explained that many households had been forced to reduce meal frequency due to poor harvests and declining income. One participant stated:

“We sell our chickens to buy mealie meal, now the chickens are dying too.” (Participant 4)

Participants also reported livestock deaths, declining market activity, and increasing dependency on informal labour opportunities provided by mining operations. However, such employment was widely described as temporary, poorly paid, and unsafe. The findings demonstrate that mining activities disrupted traditional livelihood systems without creating sustainable economic alternatives for affected communities. Participants perceived this situation as deeply unfair because local residents bore environmental costs while receiving limited economic benefits from mineral extraction.

Environmental Justice Theory argues that environmental degradation often reproduces poverty by weakening the survival systems upon which vulnerable communities depend. In Mpika, declining agricultural productivity, food insecurity, and unstable employment collectively contributed to worsening household vulnerability and economic uncertainty.

Participants also expressed resentment toward mining companies, believing that promises of community development and employment had largely failed to materialize. These perceptions strengthened feelings of exclusion and distrust toward both corporate actors and government institutions.

Social Conflict, Exclusion, and Psychological Stress

Beyond environmental and economic impacts, participants described growing social tensions and psychological distress within the community. Conflicts reportedly emerged between individuals employed by the mine and those opposing mining activities. Some participants believed that traditional leaders had become aligned with mining interests, weakening community representation and accountability. One participant observed:

“When we complain, they call us anti-development.” (Participant 9)

Participants explained that community criticism of mining activities was often dismissed as resistance to economic progress. This situation discouraged open discussion and contributed to feelings of powerlessness among affected residents. The findings further revealed widespread fear, hopelessness, frustration, and emotional distress linked to environmental decline and institutional exclusion. Participants felt unable to influence environmental decisions despite experiencing direct environmental harm. Several residents explained that complaints submitted to local authorities rarely produced meaningful responses.

Environmental Justice Theory emphasizes that exclusion from environmental governance processes reinforces social marginalization and psychological vulnerability. In Mpika, residents perceived themselves as lacking political power, institutional support, and legal protection against environmentally harmful practices. Consequently, environmental degradation was experienced not only as ecological destruction but also as social disempowerment and loss of community agency.

From the presentations above, the findings demonstrate that residents of Mpika perceive mining activities as the primary driver of environmental degradation, declining public health, livelihood insecurity, and social instability. Community members described interconnected environmental problems including water contamination, soil degradation, dust pollution, deforestation, and biodiversity loss. These environmental changes were further associated with respiratory illnesses, food insecurity, economic vulnerability, psychological stress, and social conflict. The study further reveals that environmental degradation in Mpika is not experienced as an isolated ecological issue but as a multidimensional crisis affecting social wellbeing, cultural identity, and household survival simultaneously. Participants consistently perceived that environmental risks were unfairly concentrated within the community while economic benefits remained externally controlled. Using Environmental Justice Theory, the findings highlight how unequal environmental protection, weak governance systems, and exclusion from environmental decision-making processes contribute to community perceptions of injustice and marginalization. The results therefore underscore the importance of community-centred environmental governance, stronger regulatory enforcement, sustainable mining practices, and inclusive development approaches capable of balancing economic interests with environmental protection and social justice.

DISCUSSION AND INTERPRETATION OF FINDINGS

This discussion chapter critically interprets the empirical findings of the study on the community perspectives on environmental degradation caused by mining activities in Mpika District. The discussion is organised according to the study objectives and interpreted through the lens of Environmental Justice Theory. The chapter integrates participants' lived experiences with recent empirical literature to explain how mining-induced environmental degradation has affected environmental quality, public health, livelihoods, and social wellbeing within the community. The discussion further demonstrates that environmental degradation in Mpika is not

merely an ecological concern but also a multidimensional social justice issue associated with inequality, exclusion, and vulnerability among mining-affected households.

Community Perceptions of Environmental Changes Associated with Mining Activities

The findings revealed that residents of Mpika strongly associate mining activities with extensive environmental degradation, particularly water contamination, declining soil fertility, air pollution, and deforestation. Participants perceived mining as simultaneously generating economic activity while undermining environmental sustainability and community wellbeing. These findings demonstrate that local communities possess detailed environmental knowledge derived from lived experiences and long-term interaction with their physical environment. Such perceptions are significant because they reflect how environmental degradation is socially experienced and interpreted at community level.

Water contamination emerged as the most serious environmental concern among participants. Residents reported that rivers, streams, and shallow wells previously used for drinking, irrigation, and domestic activities had become polluted and unsafe due to mining operations. Women participants particularly highlighted the burden of travelling long distances in search of clean water following the deterioration of traditional water sources. These findings are consistent with recent studies showing that mining activities contribute significantly to heavy metal contamination, sedimentation, and declining water quality in rural communities dependent on natural water systems (UNEP, 2022; World Bank, 2021). Similar findings were reported by Banda and Sichone (2023), who observed that mining communities in Zambia increasingly experience water insecurity and waterborne diseases associated with extractive activities. The findings therefore suggest that environmental degradation disproportionately affects vulnerable social groups, particularly women who carry primary household water responsibilities.

The study further established that long-term residents possessed greater capacity to explain environmental transformations because they had observed environmental conditions before and after intensified mining activities. Participants described how rivers that previously supported fishing, irrigation, and domestic livelihoods had become polluted, while streams and vegetation had progressively disappeared. These narratives demonstrate that environmental degradation in Mpika is perceived as cumulative and irreversible rather than temporary. Similar observations were made by Mensah et al. (2021), who argued that local ecological knowledge provides important evidence for understanding environmental change within mining communities in Africa. The findings therefore reinforce the importance of integrating community knowledge into environmental governance and monitoring systems.

Declining agricultural productivity also emerged as a major concern among farming households. Participants explained that dust emissions, blasting activities, and chemical contamination had reduced soil fertility and negatively affected crop production. Since most households depended on subsistence agriculture for survival, environmental degradation directly threatened food security and household income stability. These findings correspond with studies by Mwiinga (2020) and Phiri et al. (2022), which found that mining-related land degradation in Zambia contributed significantly to declining crop yields and increasing rural poverty. Similar evidence from Ghana and Peru demonstrates that mining expansion frequently disrupts agricultural livelihoods through land degradation, reduced soil productivity, and ecosystem destruction (Adu-Baffour et al., 2021). The findings therefore indicate that mining-induced environmental degradation has intensified livelihood vulnerability among rural households dependent on agriculture.

Air pollution caused by dust emissions and blasting activities was also widely reported by participants. Residents explained that dust settled continuously on houses, crops, water containers, and household property, while blasting activities generated excessive noise and ground vibrations. Participants associated such exposure with respiratory illnesses, stress, and fear among children. These findings align with recent research showing that prolonged exposure to mining dust contributes significantly to respiratory complications and reduced quality of life among populations living near mining operations (WHO, 2021; Zhang et al., 2023). Similar findings in mining communities within Zambia indicated increased prevalence of chronic coughing, asthma, and respiratory infections associated with airborne pollutants (Chileshe & Kambole, 2018). The findings therefore demonstrate that environmental degradation affects both ecological systems and human health simultaneously.

Deforestation and biodiversity loss were additionally identified as serious environmental challenges. Participants explained that forests previously used for medicinal plants, mushrooms, firewood, and wild fruits had largely disappeared because of mining expansion. This finding suggests that mining-related environmental degradation extends beyond physical pollution to include erosion of indigenous knowledge systems and cultural practices linked to natural resources. Recent studies similarly indicate that extractive industries contribute significantly to biodiversity loss, ecosystem fragmentation, and destruction of traditional ecological systems within rural African communities (IPBES, 2022; SADC Parliamentary Forum, 2021). The destruction of forests in Mpika therefore represents both ecological decline and cultural dislocation.

The findings can further be interpreted using Environmental Justice Theory, which argues that environmental harm disproportionately affects economically and politically marginalised communities lacking influence in environmental decision-making processes (Bullard, 1990). Participants consistently expressed frustration that mining companies and government institutions failed to adequately address community concerns regarding pollution and environmental destruction. Residents perceived themselves as bearing the environmental and health costs of mining while receiving limited developmental benefits. The findings therefore demonstrate that environmental degradation in Mpika is experienced not only as an environmental problem but also as a form of social and environmental injustice characterised by exclusion, inequality, and unequal distribution of environmental risks.

Health and Socio-Economic Impacts of Mining-Related Environmental Degradation

The findings further revealed that mining-related environmental degradation has significantly affected the health and socio-economic wellbeing of residents in Mpika. Participants associated environmental pollution with respiratory illnesses, skin diseases, declining household income, food insecurity, and increasing poverty. The findings therefore demonstrate the interconnected relationship between environmental degradation, public health, and livelihood insecurity within mining-affected communities. Respiratory illnesses, chronic coughing, skin rashes, and eye irritation were identified as common health problems among residents exposed to dust pollution and contaminated water sources. Participants explained that health problems had increased considerably following the expansion of mining activities within the area. Similar findings have been reported globally, where mining-related pollution has been linked to respiratory infections, cardiovascular diseases, skin complications, and long-term public health risks (WHO, 2021; Hepburn et al., 2020). Recent evidence from sub-Saharan Africa further demonstrates that communities located near mining operations face increased exposure to hazardous pollutants due to weak environmental regulation and inadequate monitoring systems (Nkulu et al., 2022). The findings therefore suggest that mining-related environmental degradation represents a serious public health concern requiring urgent intervention. The study additionally established that inadequate healthcare services worsened community vulnerability. Participants explained that local health facilities lacked specialised medical personnel, diagnostic equipment, and adequate medication to manage mining-related illnesses. Consequently, households incurred additional financial costs seeking treatment from distant hospitals. Similar observations were made by Chanda et al. (2023), who found that inadequate rural healthcare systems intensify the effects of environmental health crises in mining communities across Southern Africa. The findings therefore indicate that environmental degradation and weak public health infrastructure interact to reinforce poverty and social inequality among affected populations.

Food insecurity emerged as another major consequence of environmental degradation. Participants explained that declining crop yields, contaminated water, and livestock deaths had reduced household food production and income. Many households reported reducing meal frequency due to poor harvests and economic instability. Since agriculture constituted the primary livelihood activity for most residents, declining environmental quality directly threatened household survival. These findings correspond with FAO (2022), which reported that environmental degradation associated with extractive industries increasingly undermines rural food systems and agricultural resilience in developing countries. Similar studies in Zambia and Tanzania found that mining expansion contributes to livelihood displacement and declining food security among subsistence farming communities (Mwiinga, 2020; Kinyondo & Huggins, 2021).

Although mining activities created some employment opportunities, participants argued that such jobs were temporary, insecure, and poorly remunerated. Residents explained that traditional livelihoods such as farming

and small-scale natural resource activities had been disrupted without the establishment of sustainable alternative economic opportunities. Similar findings were reported by Hilson and Maconachie (2020), who observed that mining economies frequently create precarious labour conditions while simultaneously weakening traditional livelihood systems in rural communities. The findings therefore suggest that mining development in Mpika has generated uneven economic outcomes characterised by environmental destruction and livelihood instability. The findings further demonstrated that environmental degradation has intensified feelings of exclusion, resentment, uncertainty, and distrust toward mining companies and government authorities. Participants believed that external investors benefited economically from local natural resources while local communities experienced pollution, declining livelihoods, and deteriorating health conditions. Such perceptions reinforce Environmental Justice Theory, which emphasises that environmental burdens are often disproportionately imposed on socially and economically marginalised populations with limited political power (Bullard, 1990). The findings therefore demonstrate that environmental degradation in Mpika represents both an ecological crisis and a governance challenge associated with weak accountability, limited participation, and unequal resource distribution. Furthermore, the study established that mining-related environmental degradation has broader psychological and social consequences beyond material poverty. Participants described persistent fear, hopelessness, stress, and anxiety arising from environmental uncertainty, declining livelihoods, and worsening health conditions. These findings correspond with recent studies showing that environmental degradation contributes significantly to emotional distress, social fragmentation, and reduced community cohesion within environmentally affected populations (Cunsolo & Ellis, 2021). The findings therefore suggest that sustainable mining governance should incorporate environmental protection, public health, community participation, and psychosocial wellbeing simultaneously.

From discussions above, the findings revealed that residents of Mpika perceive mining activities as the principal driver of environmental degradation within the community. Water contamination, soil degradation, air pollution, and deforestation emerged as major environmental concerns associated with mining operations. The study further established that environmental degradation has contributed significantly to respiratory illnesses, food insecurity, declining agricultural productivity, livelihood instability, poverty, and social inequality among affected households. The findings additionally demonstrated that residents perceive environmental degradation as a form of environmental injustice because communities experience environmental and health burdens while receiving limited socio-economic benefits from mining activities. Environmental Justice Theory provided a useful framework for understanding how environmental harm intersects with exclusion, vulnerability, and unequal power relations within mining-affected communities. Generally, the findings highlight the urgent need for sustainable mining practices, strengthened environmental regulation, improved rural healthcare systems, and meaningful community participation in environmental governance processes.

CONCLUSION

This study revealed that residents strongly associate mining operations with increasing environmental deterioration manifested through water pollution, land degradation, deforestation, dust emissions, and declining soil fertility. Community members perceived that environmental conditions worsened following the expansion of mining activities, thereby affecting agricultural productivity and household sustainability. The study further established that residents view mining activities as the primary driver of ecological disruption within the community. Participants consistently reported reduced access to clean water, destruction of vegetation, and declining farming capacity. These findings demonstrate that local communities possess substantial awareness of environmental change and its direct relationship with mining operations. The study also found that environmental degradation has generated significant health and socio-economic challenges. Residents reported respiratory illnesses, skin infections, food insecurity, reduced crop yields, unstable incomes, and growing household vulnerability. The findings further revealed perceptions of exclusion from environmental governance and limited benefits from mining investments despite bearing the environmental burden. Generally, the study concludes that mining-related environmental degradation in Mpika represents both an ecological and social justice concern requiring stronger environmental regulation, inclusive governance, community participation, and sustainable livelihood interventions. Addressing these challenges is essential for improving environmental sustainability, public health, and socio-economic resilience in mining-affected communities.

RECOMMENDATIONS

The study recommends the strengthening of environmental governance through consistent monitoring, stricter enforcement of environmental regulations, and improved accountability among mining companies operating in Mpika. Regulatory institutions should ensure compliance with environmental protection standards while mining firms adopt sustainable practices such as land rehabilitation, pollution control systems, reforestation programmes, and safe waste management mechanisms. The study further recommends improved healthcare access through adequately equipped rural health facilities and outreach programmes capable of addressing mining-related illnesses affecting local populations. To reduce socio-economic vulnerability, government and development stakeholders should promote livelihood diversification through agricultural support initiatives, vocational skills training, irrigation projects, and entrepreneurship programmes targeting affected households. Community participation in environmental decision-making should also be strengthened through regular consultations, environmental awareness campaigns, and community-based monitoring structures that promote transparency and accountability. This study contributes to knowledge by providing localized qualitative evidence on community experiences of mining-induced environmental degradation in rural Zambia. The findings extend Environmental Justice Theory by illustrating how environmental risks, health inequalities, and livelihood disruptions disproportionately affect marginalized rural populations. Unlike studies emphasizing technical environmental assessments, this research foregrounds lived experiences and community perceptions, thereby contributing to scholarship on participatory environmental governance, rural sustainability, and mining-related social inequalities in developing-country contexts.

LIMITATIONS OF THE STUDY

This study encountered several limitations that should be considered when interpreting the findings. First, the research focused exclusively on Mpika, limiting the broader generalization of findings to other mining-affected communities whose environmental and socio-economic conditions may differ. Second, the study relied primarily on qualitative approaches that emphasized participants' perceptions and lived experiences without incorporating scientific environmental measurements such as laboratory analysis of water, soil, or air quality. Consequently, the study could not objectively quantify pollution levels or establish direct causal relationships between mining activities and environmental contamination. Additionally, some participants expressed hesitation when discussing mining-related issues due to concerns about victimization, employment insecurity, or strained relationships with mining stakeholders. Although confidentiality measures were implemented, these concerns may have influenced the openness and depth of some responses. Despite these limitations, the study generated valuable insights into the lived realities of communities affected by mining-related environmental degradation. Future research should therefore adopt mixed-methods approaches integrating qualitative findings with scientific environmental assessments to strengthen empirical evidence on pollution and health risks. Comparative studies involving multiple mining communities across Zambia are also recommended to generate broader national perspectives on environmental justice and mining governance. Furthermore, future studies should investigate the long-term psychological, cultural, and social impacts of environmental degradation on affected households and examine policy frameworks that can enhance sustainable development and community resilience in mining regions.

About The Authors (Biography)

Aaron Kachamba is a Stock Controller at Nitrogen Chemicals of Zambia. He holds a Bachelor of Development Studies from Mulungushi University, where he studied from 2018 to 2022, after completing his secondary education at Lwengu International School. Prior to his current role, he served as a Purchase Assistant at KADAC General Suppliers and Business Consulting in Lusaka, Zambia, from 2021 to 2024, gaining experience in procurement, inventory management, and supply chain operations. His research interests include sustainable development, mining and environmental governance, natural resource management, and community development. He combines practical industry experience with academic research to contribute to discussions on sustainable development and policy in Zambia.



Wilson L. Phiri Holds a Bachelor of Arts Degree in Sociology with Development Studies (BA-UNZA) and a Master of Arts Degree in Sociology from the University of Zambia (MA-UNZA), Zambia. He is currently a full-time Lecturer in the Department of Social Development Studies (SDS) under the School of Social Sciences at Mulungushi University, Zambia, where he teaches Sociology and Social Science Research courses. Wilson L. Phiri has extensive experience in academia and the corporate sector, including tutoring, lecturing, research supervision, training, data collection, and research consultancy. His academic and professional expertise spans qualitative research, mixed methods research, social institutions and poverty reduction, violence studies, social impact assessment, and sociological theories. His research interests include anthropological development, culture and development, project planning and evaluation, community development, rural and urban development, contemporary social issues in development, youth, crime and deviance, family and violence, and informal sector employment. His scholarly work focuses on addressing social and developmental challenges through evidence-based research and community-oriented approaches.

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