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DEPARTMENT OF SUSTAINABLE DEVELOPMENT



The impact of quarry mining on the health of the people. The case of the Odzi area.

By

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Fulfillment For The Requirements For The Bachelor of Science Degree In Development
Studies And Geoscience.**

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DECLARATION

I, Monalisa Maide, affirm that this paper is my unprecedented study, conducted solely by me. It has not been submitted, in whole or in part, to fulfill any previous academic requirement for a degree. Furthermore, this research work has been completed according to the guidelines established by the Bindura University Faculty of Engineering and has not been submitted by myself or any other person for any other purpose. I further declare that where other work is submitted somewhere else, it is stated by reference or acknowledgment.

APPROVAL

This research project aligns with Bindura University's presentation standards and has submitted for review to ensure adherence to departmental guideline

STUDENT'S SIGNATURE



SUPERVISOR'S SIGNATURE



DATE: 14/06/25

DEDICATION

I offer my gratitude and dedication to the Almighty for the Divine guidance and grace all the way through this study journey. This paper is dedicated also to my husband, who supported me constantly financially and spiritually. Additionally, I much salutation to my entire family for the prayers and motivation. May God bless each and every one of you.

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A heartfelt thanks to Mr. T. Samukange for invaluable super vision and backing, which crucially contributed to my success for this research. His patience and dedication in sharing his expertise were important in shaping my understanding and producing this research. I extent my heartfelt gratitude to friends for unyielding encouragement for this milestone. Lastly, I'm sincerely happy with the institution of Bindura University of Science Education for giving I an opportunity to prove my intellectual capabilities throughout my four-year study of Bachelor of Honors Degree in Development Studies and Geo-Sciences, under Sustainable Development Department of the Faculty of Science and Engineering.

ABSTRACT

The exploration investigates the impact of quarry mining on the health of the people in the Odzi area. It examines the various health issues arising from quarry mining activities, including respiratory problems, skin diseases, and other health complications. Statics of the extent of quarry mining on the people's health were also carefully studied. The study also explores the socio-economic factors that contribute to the health problems experienced by the local community and provides recommendations for mitigating the negative health impacts of quarry mining in the Odzi area.

Table of Contents

DECLARATION.....	2
DEDICATION	3
ACKNOWLEDGMENT.....	5
CHAPTER 1	10
1.1 Introduction	10
1.2 Background	10
1.3 Problem statement	11
1.4 Objectives.....	12
1.5 Limitations.....	12
1.6 Delimitations.....	13
1.7 Hypothesis.....	14
1.8 Justifications/ Significance of the study.....	14
1.9 Assumptions.....	16
1.10 Definition of key terms	16
1.10.1 Quarry mining	16
1.10.2 Health.....	17
1.11. Summary	17
CHAPTER 2: LITERATURE REVIEW	17
2.1 Introduction	17
2.2 Quarry mining: Context and conceptualisation	18
2.3 Negative impacts of quarry mining on the health of the community	18
2.4 The extent of negative impacts of quarry mining on the health of the community	20
2.5 Legal position in line with quarry mining.....	22
2.6 Chapter summary.....	23
CHAPTER 3 RESEARCH METHODOLOGY	24
3.1 Introduction	24
3.2 Research approach.....	24

3.3 Research design	25
3.4 Sampling process	25
3.4.1 Population	25
3.4.2 Sample size.....	26
3.4.3 Sampling.....	26
3.5 Data collection	26
3.5.1 In-depth interviews.....	26
3.5.2. Focus groups	27
3.6 Data analysis	27
3.7 Secondary data	27
3.8 Limitations of the study	28
3.9 Ethical consideration.....	28
3.10 Chapter summary.....	29
CHAPTER 4: PRESENTATION AND DISCUSSION FINDINGS	29
4.1 Introduction	29
4.2 Participants' demographic data	30
4.3 The extent of the negative impacts of quarry mining on the health of the community	32
4.4 The Negative Impact of Quarry mining in the Odzi area	33
4.4.1 Respiratory problems.....	33
4.2.2 Water-borne diseases	33
4.2.3 Noise-induced hearing loss	34
4.2.4 Mental Health Issues.....	34
4.3 Chapter Summary	35
CHAPTER 5: CONCLUSION AND RECOMMENDATIONS	35
5.1 Introduction	35
5.2 Summary of findings	36
5.3 Conclusions of the study	36
5.4 Recommendations	36
5.5 Chapter summary.....	39

BIBLIOGRAPHY	40
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CHAPTER 1

The impact of quarry mining on the health of the people. The case of the Odzi area.

1.1 Introduction

Mining is one of the recognized sources of income for the whole country. According to a survey, mining acts as a fundamental impact to Zimbabwe's economy. Mining pays 5% to the economy and to the country's gross domestic (GDP) it totals to 23% and whole exports, in that order. Although recognized as an economic pillar, it has posed some dangers for the whole country, particularly in areas where it is done. Odzi is one of the areas where small-scale miners practice mining both commercially and illegally. Extensive unlawful mining in Odzi in Manicaland province, has steered to a rise in school dropouts and early child marriages in the area. Quarry mining in Odzi has posed great dangers to health of the people in Odzi. It poses dangers directly and indirectly to the health of people around Odzi. Nevertheless, quarries are indispensable to modern life, supplying essential materials for infrastructure development they form the pillar of transportation networks including roads, railways, airports and water and sewage systems. The demand for aggregates is immense as stone plays a fundamental role in constructing homes, factories, schools, hospitals and commercial centers. As a result, quarries are crucial to a nation's economic growth and sustainability thereby making quarry mining not just necessary but vital for continued development.

1.2 Background

Quarry mining in the Odzi area has survived for decades. Odzi was established as an area during the colonial era around 1899. The area is rich in different mineral deposits. These include gold, clay, granite, limestone, and sand gravel, mainly extracted in Odzi. There are vast gold deposits within the area. To support the above statement, several discoveries on the surface including old tunnels, old railway lines, and pegs have been and are still being discovered within the mining sites in Odzi. Some of these discoveries are said to belong to the Germans meaning that different groups of people have carried out mining. Recently, the area has attracted different groups of people because of its large gold deposits being discovered both regionally and internationally.

People recently flocked to the area in search of gold such as people from Shurugwi, Kadoma, Penhalonga, and other groups from neighbouring villages and places. The Chinese have recently arrived in the area and are legally carrying out their mining activities. The Chinese are also carrying out mining activities within the Odzi area. Some illegal miners are operating and other registered miner owners also contributing to the country's economy. From a clear examination of the situation on the ground in Odzi mining areas, it is clear that there was shaft mining, with time, and due to illegal mining activities with lack of equipment, there increased quarry mining. Quarry as a form of mining is cheap as it requires less capital but in return can be dangerous to society as will be unfolded by this research. There is an increase in quarry mining within the area. Quarry mining includes small-scale gold, limestone, sand, and gravel. With the expansion of population, more area is cleared for settlement purposes. There is a need for more building materials such as granite, sand, and gravel. More people are involved in quarry mining to meet the demands of the increase in construction. Quarry mining is thus done everywhere even in areas not designated for quarry mining causing dangers to society, particularly to the people's health. Odzi consist of different groups of people and quarry mining is mainly practiced by the local people.

1.3 Problem statement

The impact of quarry minning particularly the negative ones, need to be dealt with at large for the local people's health. The effects on the health of people around Odzi area is a major concern that requires an emergency solution. Extraction of minerals such as sandstone from open pits has resulted in the discharge of dust and other pollutants into the air, which as a result damages the respiratory systems the local population. Additionally, the usage of heavy machinery in quarry in quarry mining results in noise pollution which is also hazardous to the health of the local people. The disposal of waste materials from the quarry mining process can result in the contamination of local water sources, which can harm the health of the community, especially in rainy seasons. It is important to look on these matters and maintain the fitness and happiness of the people in the Odzi area are protected and their health is considered as much as quarry mining is being carried out.

This is an assignment that should be carried out by all stakeholders involved in the quarry as well as the government at large.

1.4 Objectives

- a) To analyse the impact of quarry mining on the health of the local people in the Odzi area.
- b) To suggest possible ways that can be put in place to align quarry mining and the health of the people in the Odzi area.
- c) To explore ways that can be put in place to deal with the negative impact of quarry mining in the Odzi area.
- d) To suggest recommendations that can be put in place to deal with the negative impacts of quarry mining on the health of the people in the Odzi area.

1.5 Limitations

- a) One of the limitations of my research area is transport. Odzi is located along the Harare-Mutare highway. It is about 241 kilometres away from Harare. It is an area that is not just along the highway but a few kilometres from the highway making it uneasy to reach out.
- b) Another limitation to my research is financial issues, there is a need for finance to fund transport and other expenses that are required along the way of my research.
- c) Time is another limitation of my research. Odzi is an area that is outside Harare, it requires about 3 hours of travel from Harare. This is a lot of time because I am a final-year student with a lot of demanding schoolwork.
- d) Uneasy to open up to the local people is another limitation of my research. My research requires cooperation from the local people and personal interaction with them. It is not every individual who can open up on sensitive issues like the one in question. Due to political reasons, many people are not comfortable with opening up some issues affecting their communities. This means that only the bold ones may be able to open up freely.

- e) Time constraints are another limitation of my research area. Open-cast mining is a type of mining that is done over a long period for its effects to manifest. However, I am limited with time for my research. For the research to be fully carried out to yield positive results, there is a need for more time.

1.6 Delimitations

- a) Scope of Study: Clearly define the geographical location of my research area and the time frame for the study. It focuses on a specific community within the Odzi area and specifies the period during which the data will be collected because Odzi at large is a huge area and covers a large area hence there is a need to scrutinise the area to focus on a specific area.
- b) Data Availability: Ensures that there is sufficient data available on health records, environmental impact assessments, and quarry mining activities. Limited data availability can restrict the comprehensiveness of the study. This means that surrounding hospitals other health centers and healthy personnel will all contribute to positive results.
- c) Health Parameters: Identifying which specific health parameters will be studied, such as respiratory issues, cardiovascular diseases, or other health impacts. It aid in designing a study and making sure that all related aspects are covered. The word 'health' is wide and it covers a lot of aspects, to produce positive outcomes, suggestions, and recommendations, there is a need to focus on specific health parameters.
- d) Environmental Factors: These are going to be considered specifically the environmental factors that could influence health, such as air and water quality, noise pollution, and dust. Ensure that these factors are measured and analysed about health impacts.
- e) Economic and Social Factors: The research will take into account the socio-economic status of the public, access to healthcare as well as other relevant factors that could influence health outcomes. This will provide a more holistic view of the impact of quarry mining in the Odzi area.
- f) Regulatory Framework: This is the area of examining the existing regulations and guidelines governing quarry mining and their effectiveness, the laws or by-laws that are

in place to regulate quarry mining within the area. This will help in understanding the level of compliance and the potential for regulatory improvements if needed to minimise the damage of quarry mining on the health of community at large.

- g) **Community Participation:** Engaging with the local community at large to gather insights and perspectives on the problems being brought forward because of quarry mining. This can provide valuable qualitative data as well as making sure that the study is sensitive to community's necessities and concerns. This gives room for face-to-face interaction and room to ask questions and immediate responses.
- h) **Ethical Considerations:** Ensuring that the research follows ethical values, particularly in terms of participant consent, confidentiality, and the handling of sensitive health information. All the people involved are going to contribute willingly and no force or coercion is going to be used in any way to have full information on the focal point of my research without jeopardising one's human rights.

1.7 Hypothesis

The exploration aims to answer the above questions:

- a) What are the negative impacts of quarry mining on the health of the community in the Odzi area?
- b) What does the law say about quarry mining in the Odzi area?
- c) What do the people in Odzi say in line with the quarry mining activities within their area?

1.8 Justifications/ Significance of the study

- a) The exploration on the impact of quarry mining on the health of the people specifically in the case study of the Odzi area, is crucial for several reasons:
- b) **Environmental Impact:** The study sheds lighter on the environmental degradation caused by quarry mining which has both short- and long-term effects. These include soil erosion leading to sedimentation, water contamination, loss of biodiversity as well as disturbed natural ecosystems. These if understood carefully, will help in creating a sustainable mining environment and practices.

- c) **Public Health Concerns:** Public health concern is the pillar of the research study. Quarry mining activities generate dust that, when inhaled may cause respiratory-related diseases such as asthma, bronchitis, and other lung-related diseases. This research will help in understanding these diseases and potential solutions to such problems.
- d) **Community Awareness:** Highlighting the health risks associated with quarry mining, raises awareness in the local communities and other stakeholders about the importance of sustainable practices and the need for proper environmental and health impact assessment before initiating any mining project. It is not every person within the area who is aware of the problems associated with quarry mining.
- e) **Governmental Insight on economic implications:** The health issues arising from quarry mining in the Odzi area can lead to increased medical expenses and reduced productivity. This research can be used as an insight by policymakers about the economic cost associated with environmental degradation. It can also be used when planning the national annual budget, especially for the health sector and associated expenses.
- f) **Regulatory Framework:** the findings can help in formulating and enforcing regulations that mitigate the adverse health and environmental impact of quarry mining. The research shall unfold all the loopholes that are present within our current legal framework in line with quarry mining. This will help to ensure that quarry mining operations are conducted in a manner that protects public health and the environment.
- g) **Long-term Sustainability:** The research although being carried out now, will contribute to the broader discourse and sustainable development, emphasising the need for balanced approaches that consider economic, environmental, and social factors. It underscores the significance of integrating health and environmental considerations into the decision-making process.
- h) **Comparative Studies:** Odzi area is not the only Zimbabwean area whose health condition is at stake due to quarry mining. The case study of the Odzi area can thus serve as a reference point to similar regions in Zimbabwe, providing valuable insights into the

universal challenges and solutions, suggestions, and recommendations related to the health impacts of quarry mining.

1.9 Assumptions

The following are assumptions in line with my research project:

- a) The people in the Odzi area's health are being jeopardised by quarry mining in the area.
- b) The people in the Odzi area are relying on quarry mining as a means of earning a living.
- c) Quarry mining is posing more problems each day in the health sector of the community at large.
- d) There is not enough medication to cater to the health of the people in the Odzi area.
- e) Some of the quarry mines in the area are not registered or have no full documentation meaning there is illegal quarry mining in the Odzi area.
- f) The people within the Odzi community have not yet put forward their grievances for national redress.
- g) I will engage with the relevant stakeholders within the area including the responsible authority, the community at large, and the quarry miners to come up with positive solutions and suggestions.

1.10 Definition of key terms

1.10.1 Quarry mining

Before defining the words 'quarry mining,' it is salient to delve into the meaning of the word quarrying about mining. Quarrying is a segment of the broader extractive industry where natural stone, gravel and sand collectively known as aggregate are sourced directly from the earth's surface (PCM Admin, 2020). It involves extracting buried materials from beneath the surface. the term quarrying is often with sites where natural stone is extracted for construction purposes like building or dimension stone.

1.10.2 Health

Health is not simply about not being sick but it's a state of thriving. It means having a strong, active body, a clear and resilient mind as well as meaningful social connections. Since the World Health Organisation adopted this concept back in 1946, it has gained widespread acceptance. It comprises the capacity to manage stress and difficulties as well as the ability to function and adjust to the demands of daily life. Numerous factors, including genetics, lifestyle, environment, and access to healthcare services, all have an impact on health, which is a dynamic and multifaceted condition. A comprehensive strategy that takes into account all facets of well-being is necessary to maintain excellent health. (Kessler & Üstün, 2004)

1.11. Summary

Quarry mining although beneficial to the miners, their families, and the society at large, if excessively practiced without following the authorized means and without using protective clothing, can cause health problems to the community at large. The case study of the Odzi area is an example of how quarry mining although a means of survival, can turn life upside down to the people. This chapter focuses on the main areas that need to be fully addressed so that quarry mining does not pose dangers to the community or minimises the dangers it poses.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The part delivers complete evaluation on current literature on quarry mining and its impact on human health. It examines previous studies, theoretical frameworks and key findings. This chapter will focus on the literature review, particularly about quarry mining and its negative effects on people's health.

2.2 Quarry mining: Context and conceptualisation

Quarry mining as a means of mining is rapid in most parts of Zimbabwe. **T Chigonda**, notes that there are some areas in Zimbabwe where quarrying has been practiced. Mutoko is among the regions where quarrying has been done extensively. It is an area rich in granite stone, a precious stone important in different sectors of the country. Quarry mining in Mutoko dates back to the BSAC era. In his article, stated that large-scale quarrying operations have grown in Mutoko District as a result of rising call for black granite, especially in the construction industry. Mutoko is now a significant mining region in the nation as a result of the development and growth of black granite quarrying operations there. Before this, there were no significant mining operations in Mutoko. Although there has not been any, thorough investigation on the effects of black granite quarrying in the study area, several stakeholders' reports, including those from the local communities surrounding quarry sites, have identified several detrimental effects. Other interested parties have also questioned whether the current black granite quarrying operations in Mutoko District may benefit the area in any way.

2.3 Negative impacts of quarry mining on the health of the community

Quarry mining although it is a source of income, has several negative impacts on the health of the community. Different scholars have identified some of these negative impacts. Health hazards is among the negative impacts of quarry mining. The dust and particulate matter generated by quarrying operations can pose serious health risks to nearby residents.

Dr. Sandhya P and Sneha Krishnan have their way of viewing quarry mining and it needs to be analysed. According to them, air and noise pollution are the main results of quarry mining as they have a bigger environmental impacts. Dust is the most dominating with its severity influenced by factors like local microclimate conditions and particle concentration in the atmosphere. It causes problems to human health and surrounding ecosystem. Adding on, noise pollution associated with unwanted and disruptive sounds affects environmental balance and human well-being. Activities like blasting, loading, heavy machinery operations, stone crushing and transportation contribute substantially to noise pollution causing effects on nearby communities. (Dr. Sandhya P and Sneha

Krishnan, 2020). The above author has extended their view on quarry mining and its effects. Dust from quarry mining affects the health of the people. It is the backbone of most airborne diseases such as asbestos, black lung disease, silicosis, and occupational asthma. These diseases affect the community and also the people involved during quarrying. To extract the minerals, sand, or gravel from the earth, some use heavy machinery. These types of machinery cause noise pollution and air pollution. From his commentary, noise and vibration pollution are also surrounded by the destructive impacts of quarry mining, a danger to the health of the community. **Quarry Miner Moves to Mitigate Pollution After Residents' Protest**, this is another Zimbabwean update on the issue of quarry mining in Zimbabwe. The community took the matter further by going to court for redress. This was after the court considered the matter for redress.

These are residents from a suburban area in Harare who decided to seek legal relief because of the impact of quarry mining on their health. From the report, the residents were complaining of the noise that was coming from the quarry blasts how the vibrations were damaging their houses, and the dust that was emanating from the Crusher Plant. In response to these allegations, Elias Chizema, Harare Quarry's Acting General Manager, aims to coexist harmoniously with Arcadia suburb residents by using water suppression methods and shock tubes to minimise noise and vibrations to reduce the negative effects of quarry mining. (Reporter, 2021).

The authors stressed the need to balance mining effects both positive and negative. The body of research on the health and well-being of people impacted by massive natural resource extraction operations is primarily quantitative and focuses on particular illnesses or reasons why certain health effects occur. The broader determinants of health about resource exploitation have received relatively little attention in research. Furthermore, there is a dearth of qualitative research examining health as a complex issue. As a result, impacted populations' perspectives are frequently severely underrepresented in the relevant scientific literature. Therefore, it is problematic and restricts full involvement with communities that the chance to fully capture opinions and attitudes was lost. (Karakaya & Nuur, 2018).

Health effects of quarry mining extend to water bodies of the community. Quarry mining often results in contamination of nearby water bodies due to runoff of sediments and pollutants from mining operations. This can lead to increased turbidity and the introduction of harmful substances into the water, upsetting the life of aquatic and making the water insecure for people to use leading to water quality degradation. The excavation processes involved in quarry mining can disrupt natural water flow patterns. This alteration can lead to changes in the hydrology of the area, affecting both surface and underground water levels. These changes in turn affect the ecosystem and the community since % of the people in Zimbabwe rely on surface water flow for domestic uses. (Kafu, B, &Mlaba, S. 2024)

2.4 The extent of negative impacts of quarry mining on the health of the community

Quarry mining in Zimbabwe accounts for approximately 10% of the country's total mining output. This includes the extraction of sand, gravel, and other construction materials. Chazireni (2003) used multiple component analysis to evaluate Zimbabwe's 57 districts according to their socio-economic development level, placing Mutoko District in the list of the ten developed districts in despite quarry mining being practiced there. Mutoko's black granite resources may catalyse socio-economic growth. This can only be fully achieved, though, by first determining the effects of the area's ongoing black granite quarrying operations, which are currently poorly understood, and then devising strategies to maximize the positive effects and minimise or even completely eradicate the negative ones. Kesler (1996) mentioned that there are danger of quarry mining including destruction of natural landscape, surface pollution, contamination of soils, erosion and disturbance of ecosystem and local vegetation as well as displacement of wildlife, creation of ghost towns and death of miners through accidents. There are different companies that are involved in quarry mining in Mutoko, these companies are making efforts to minimize the dangers on health of people. These quarrying firms also sometimes offer free transport to take ill villagers to Mutoko General Hospital. Such a service is crucial as there are no emergency health services in these areas. (Tanyaradzwa, 2010). Many problems are coming out as a result of quarry mining. This in turn

makes it hard for people to survive and increase the governmental load on offering services to its people despite these mining operations.

The extent of the effects of quarry mining can be expressed as maximum. Some notable areas that were researched on, show that there is social unrest and noise on every angle such that the community will be affected by this kind of noise. Although some people are affected indirectly, they are affected and there is a need to minimise these effects. From a carried out survey, statistics show that quarry mining has endangered the lives of the community. (Dr. Sandhya P and Sneha Krishnan, 2020) These health issues highlight the significant health risks associated with quarrying activities. The study found that 15% of people experienced headaches before and after quarrying, while 35% had eye problems. Stress levels increased from 5% before quarrying to 40% before and 40% after quarrying. A significant percentage of people experienced throat infections before quarrying, which increased to 25% during quarrying. Allergies were also higher than before quarrying, with some experiencing dust-related diseases during quarrying. These findings highlight the need for improved health and safety measures in the mining industry. (Abhishek Pandey (2018),). There are different health complications in quarry mining. The previous authors have shed light on some of them mostly as a result of dust and other outputs from quarry mining.

Chiadzwa is a well-known area located in Manicaland. It is an area that is rich in mineral deposits mainly diamond. It came to light when large deposits of diamonds were discovered in the area. It is an area close to Odzi. After the discovery of diamonds, the local people started to mine diamonds illegally until the government intervened. In the article entitled, **‘The Social, Economic and Environmental Implications of Diamond mining in Chiadzwa.’** Some effects of mining were further expressed. Villagers grumbled about the moral decline occurring. Males and females bathing together in the same location is frowned upon. But with the panners, open bathing between men and women had become the standard. Elders also expressed concern about the growing instances of robbery, bride snatching and eloping, and the increasingly offensive and coarse language, as well as the lax morals that permitted illicit sexual encounters. The enormous number of sex workers that moved to the Chiadzwa area fostered widespread sexual misconduct, which

had an impact on HIV transmission and other STDs. Regretfully, though, no formal documents exist about these matters. However, in addition to this health problem, Chiadzwa experienced a cholera outbreak at the end of 2008, which initially increased the mortality rate among panners due to their way of life before eventually hitting all villages equally. The precise number of fatalities was unknown, however, Chipindirwe, Bettera, and Chirasika communities reported large numbers. (Kachembere, 2011). These can be said to be the maximum negative impacts of quarry mining in Zimbabwe.

2.5 Legal position in line with quarry mining

There are different laws in Zimbabwe regulating all mining and quarry activities. Mines and Minerals Act [chapter 21:05] is among these Acts. In terms of section 403 of the Mines and Minerals Act [chapter 21:05], ‘The Minister may make such regulations as he may deem expedient to give force or effect to this Act or for its better administration in matters such as the safety and health of persons employed in or about any mining location, quarry or mining operations.’ Although there is a governing law, it is expedient to note that some of these considerations have not yet been taken into place. This is because the community and the parties affected may not be aware of the available laws for their goodness. In line with the section named above, the Minister of Mines has the right to shut down all the mines, and quarry that fails to comply with the health and safety of its subjects. The principal Act (Mines and Minerals Act [chapter 21:05]) covers various aspects of mining rights, including acquisition, establishment of the mining Affairs Board, prospecting, mining leases, rights of claim holders and land owners, preservation of rights, working of deposits, control of sighting, abandonment, forfeiture, transfer registration, hypothecations, options, tribute agreements, special grants, mining on town lands, acquisition of land by leaseholders or the state, expropriation of undeveloped locations, termination of share royalties entitlement, administration of the Act, and penalties.

The mining (General) Regulations, issued by the Minister under the Mines and Minerals Act, cover various aspects of mining and are updated periodically through Statutory Instruments (SIs). The

mining (Management and Safety) Regulations, contained in SI 109 of 1990, cover areas like management, surface protection, workplace protection, outlets, ladder ways, and travel ways.

The mining (Health and Sanitation) Regulations outline health and sanitation regulations, including adherence, power of entry, sanitary conditions, waste disposal, latrines, medical examinations, and employee care. The Mines and Minerals (Custom Milling Plants) Regulations regulate custom milling plant operations, with amendments made under section 403 of the principal Act. The Minerals and mining (Explosives) Regulations cover explosives use in mining.

2.6 Chapter summary

The chapter dealt with the literature review in line with quarry mining and its effects on the community's health. Statistics were explained in line with the effects of quarry mining in Zimbabwe. Different impacts of quarry mining on the health of the people were explained in detail. Some laws governing mining and all mining activities have been discussed in line with quarry mining and its health effects on the community at large. Although mining is a source of income in Zimbabwe, it has some negative impacts on the health of the miners and the community.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Introduction

Research methodology is crucial in this research study as it provides a systematic and structured approach to conduct the research it includes a detailed explanation of the strategy and design utilised to conduct this research. The procedures relating to selecting, processing, and implementing data collection instruments are described, along with the rationale for their use. Additionally, the chapter will cover aspects of data collection, analysis, and considerations of validity, reliability, and other crucial components of the research. This research study was conducted using a qualitative research method, chosen specifically to unfold the negative impacts of quarry mining on the health of the people in the Odzi area and to identify potential solutions to this issue. This methodology is important in this research topic as it helps to determine the appropriate research methods to be used in the study, ensuring that study is conducted rigorously and systematically and that the findings obtained are valid and reliable.

3.2 Research approach

This research utilises a qualitative approach. It is defined as a market research method that focuses on obtaining data through open-ended and conversational communication. This method is about considering the views of the people, what people think, and why they think so. This research approach can differ greatly based on the theoretical framework, philosophical stance, assumptions about knowledge, and the specific field under investigation. Qualitative research is a way of determining and conceptualising social and human problems from the views and opinions of individuals or groups (Creswell 2012). Along with the qualitative research method, some people within the community, some health workers, and other specialists within the area are going to be questioned on what they think about the effects of quarry mining on the health of the people and why they think so in an open questioning session and some interviews to be carried out. Qualitative research methods are designed in a manner that helps to reveal the behaviour and perception of the affected people regarding the impact of quarry mining within the Odzi area. Different types of

qualitative research methods such as in-depth interviews, focus groups, content analysis, and case study research shall be used in this research topic. (Bhat, 2024).

3.3 Research design

It lays out the specific steps , procedures and methods we will use to collect , analyze and interpret data necessary to answer the research question. In this study, much focus on the Odzi area in the Mutasa District is given as a case study. Typically this approach emphasizes qualitative techniques, allowing to gain rich insights from the context and it also have the flexibility to incorporate quantitative measures when needed. A case study is more than just a method rather it is an in-depth approach which explores a clearly defined issue with great detail and nuance. The case study of the Odzi area can be said to be a descriptive case study in nature because it allows the researchers to investigate a phenomenon from the participants' lived experiences in narrative form. In this research, participants from different groups such as parents, students, teachers, health workers, and other public figures mostly who are on the ground with primary knowledge of the current events of the area within the area were interviewed for a better insight of the research.

3.4 Sampling process

3.4.1 Population

In research, the study population consists of participants or objects involved in gathering insights (Mijid, 2018; Pilot & Humler, 1999:33). It includes everyone who contributes to shaping the study's outcomes. The research population often called the target population also refers to the broader group of individuals, objects or events that share specific characteristics relevant to the study. It serves as the foundation from which a sample is drawn for analysis. This research targeted the people in the Odzi area from different age groups particularly those who reside within the Odzi area including, the parents, children, health workers, teachers, the police force, and the miners in the capacity of miners. For positive results, it is important to focus on the specific group of people with direct and clear answers to the questions to be posed.

3.4.2 Sample size

Sample size as used in this research refers to the number of participants to be included in the study. Considering the large size of the population in Odzi, few people were selected from each category stated in previous sections to participate in this research. Parents, teachers, policemen, health officials, and miners were the major groups to actively participate in the research study. From each group, a minimum of five mixed gender participants were picked on a random selection for further interviewing.

3.4.3 Sampling

The area of study is so large that it accommodates a large number of people hence for positive results on the research questions, sampling is a necessity. Sampling has been defined as a process of selecting participants of the study from the population frame (Babbie 2001). A random sampling method was used in this research. This method is based on selecting individuals among others on a random basis without making any observation on any distinct character of them. This method ensures that each individual has a chance of being selected. Different individuals were selected on a random basis for further questioning and interviews on the impact of quarry mining in there are of Odzi area.

3.5 Data collection

This research focused on three main data collection techniques namely in-depth interviews and focus groups

3.5.1 In-depth interviews

In-depth interviews are used by researchers to grasp the thoughts of selected research participants in a given area about a given subject being studied (Jensen 1982). It allows an open interaction between the researchers and the participants. In this case, participants were interviewed about the impact of quarry mining on the health of the people within their area. There are three kinds of interviews namely structured, semi-structured, and unstructured, and all of the three kinds were applied in this research (Dawson 2009). This study adopts semi-structured interviews. The

interview guide with high-level questions and high-level topics was used as a research instrument to interview participants.

3.5.2. Focus groups

These are valuable qualitative research method that involves gathering a small diverse group of people to discuss a particular topic or matter. Usually the groups are made up of 6-10 participants depending on the research objectives (Staff, 2024). It allows participants to put forward their views in a debatable manner. Groups are created specifically for an insight view on the impact of quarry mining on the health of the people in the Odzi area. At least five groups of mixed gender were created and posed with questions for an in-depth understanding. The findings from these focus groups were recorded.

3.6 Data analysis

This type of research relies on thematic data analysis. It is a type of qualitative data analysis that involves finding and examining themes within a given dataset. It is best used to analyse textual records including interviews, focus group discussions and open-ended survey responses. Thematic analysis allows the researcher to draw patterns that exist on the impact of quarry mining on the health of the people in the Odzi community such that facts will be established. In this regard, the researcher uses thematic analysis by arranging the negative impact of quarry mining on the health of the people in the Odzi area and possible strategies that can be developed into categories for thematic presentations.

3.7 Secondary data

The word ‘secondary’ means automatically reflects a second in the way in which the data has been obtained or is to be obtained. Whenever one wants to do a research using data that already exists, you are conducting secondary research. Some notable examples of SDA include case studies, literature reviews and content analysis. This research also relied on secondary data from former analysed and stored data such as health officials’ databases, toe local support people’s diaries, and other trusted data storing elements to assess the impact of quarry mining on the health of the public in the Odzi area. All collected data were recorded and stored.

3.8 Limitations of the study

The above research faced some backwards just like all other research. Research limitations affect all kinds of studies including this research case hence it is not exempted from research constraints that can affect the findings and their generalizability to other contexts (Babie 2020). Some of this research back draws will be explained in detail in this section. From the onset, the scope of the research itself is a limitation of this case study. This research is limited to the Odzi area only focusing on the health impact of quarry mining. This may limit the generalizability of the findings to other areas. Confounding variables are another sounding limitation of the current research study. Confounding variables or lurking variables are the variables that affect the cause and outcome of the study (says, 2024). There may be other factors that could influence the health of the people in the study area, such as socio-economic status, access to healthcare, or environmental factors, which may confound the relationship between quarry mining and health outcomes. Due to temporal relationships, it may be difficult to establish a clear temporal relationship between quarry mining and health outcomes, as there may be delays or lags in the impact of mining on health. At the end of the day, the blame is only cast on quarry mining ethical considerations may raise ethical concerns, such as the potential for stigmatization of mining communities or the need for informed consent from study participants. It is crucial to take note of ethnical differences in different parts of the country in Zimbabwe. An awareness of a specific area may be mistaken as an ethnical segregation.

3.9 Ethical consideration

Every research project must follow the ethical considerations of every research area. This research topic is sensitive hence careful considerations must be enhanced. These are ethics that guide the bearing of research or practice to make sure that fairness, transparency and respect for all parties involved. Participants' rights, data integrity and security is protected and maintained. It often includes informed consent, confidentiality, conflict of interest and the minimization of risks. Consent before any participant is interviewed is very crucial. This research adheres to all ethical considerations. Participants are totally well-versed about research's purpose, methods, dangers and profits of this interview. Community engagement, vulnerable populations, environmental justice,

collaboration with health authorities as well as long-term monitoring are among some ethical considerations that have been employed in this research study. In addition to the above ethnic considerations in submitting the findings, the researcher avoids plagiarism by maintaining in-text and reference requirements

3.10 Chapter summary

The focal point of this chapter was the methodology employed in this chapter. This research relied on qualitative data analysis, outlining the following issues: research approach, research philosophy, research design, sampling process, and data collection techniques. The chapter further discussed data analysis techniques and provided ways in which the trustworthiness of the findings can be assured. SDA was also discussed for further insight.

CHAPTER 4: PRESENTATION AND DISCUSSION FINDINGS

4.1 Introduction

This chapter focuses on the presentation, discussion, and analysis of the findings from the research topic entitled "The impact of quarry mining on the health of the people." In the case of the Odzi area, the findings in this chapter will shed more light on this impact. The conclusions of the

previous chapter will unfold in this chapter and all the research questions will be answered in this chapter. Different participants were selected and interviewed for further questioning and the data was recorded.

4.2 Participants' demographic data

Variable	Category	Number of Respondents
Group of Participants	Children	10
	Parents	10
	Health workers	10
	Teachers	5
	Police force	5
	Miners	15
Sex	Males	35
	Females	20

The demographic data above is an overview of all the participants involved in the research on the effects of quarry mining on the health of the people in the Odzi area. Different groups were interviewed and different numbers. The data was recorded for further insight. Mixing different groups of participants aids in producing better results on the research topic. Not only the people who were directly affected were interviewed but some other groups were also interviewed who had direct and indirect insight on the research topic although the target group is the people within the study community. It is indeed necessary to record data from the above groups to come up with the exact results as per the research.

There was a mixed number of participants who were interviewed in different research groups. The smallest number of age groups interviewed were the children, teachers, and the police force. The children who are primary and secondary pupils were interviewed. This age group is necessary because it allows the researchers to uncover broader and some hidden views on how the young generation perceives quarry mining in the area.

A total number of ten health workers were interviewed. These individuals were necessary because they were responsible for the health of the people. They are the ones who assist all the people who have been affected by quarry mining.

The police were also interviewed. These are the members of the peace conservative within the community. They record all the legal matters being brought to them. They allowed their recorded data to be looked into to see the extent of the effects of quarry mining on the people within the Odzi community.

The miners' views were recorded down. These are the people who are directly affected by quarry mining. 15 miners were interviewed. The large number was necessary for easy comparison because it made it easy to compare the findings from each participant. This broader number of miners allows the researcher to potentially uncover perspectives from those who may have been affected by quarry mining. By capturing this diversity of different groups of participants, the study can paint a more holistic picture of the impact of quarry mining on the health of the people in the Odzi community.

The gender breakdown of the sample also reflects the specific objectives of the research, with 35 male participants compared to 20 females. This male-majority composition is crucial given the study's laser-like focus on an economic activity that males mainly dominate. However, every individual within the community feels the impact of such activity. Elevating the voices and experiences of this affected community is a central aim, and the gender distribution of the sample facilitates that goal.

4.3 The extent of the negative impacts of quarry mining on the health of the community

The rapid increase in quarry mining in Zimbabwe particularly in the Odzi area has brought some worrisome to the whole community. The carried out survey from the study area has shown that the health of the people is largely affected by quarry mining during rainy seasons as compared to summer seasons. The table below further illustrates:

Table 1.2 Extent of the negative impact of quarry mining on the health of the people in the Odzi community

SEASON	ESTIMATED ILLNESS PER 100 PEOPLE
SUMMER	40
WINTER	20
RAINY	70

From the table above, the rainy seasons have a great effect on the health of the majority of the Odzi community. Further studies showed that these dangers are a result of water bodies being polluted by the chemicals from nearby mines. In every 100 people, almost 70 of them are greatly jeopardised by quarry mining. The effects come in different health points either via drinking water, respiratory, or another area. This is because of the location of the mines; they are located everywhere leading to pollution of waterways during the rainy season. Odzi draws its water for major consumption from the Odzani River, the river is being affected by the mining activities within the community. Some of the chemicals are poured into the river. In the summer season, due to dust and other pollution from the mining sites, a large number of people suffer from respiratory issues as a result of dust and other dangers from the mines. Previous research carried out in India speculates that there have been reports of particularly high occupational health risks and worker death among different workers in India. Studies have reported the prevalence of asthma, breathlessness, cough, chest pain, silicosis, and various other respiratory complications among

quarry workers (Rajanayagam et al., 2023). In winter seasons, the impact of quarry mining is minimal as shown in the table above. This might be because of less dust generated and less water involved during quarrying.

4.4 The Negative Impact of Quarry mining in the Odzi area

Quarry mining has proved to be a means of survival bearing in mind its effects on the health of the community at large. Even though not every individual in the community is involved in quarry mining, the impact is felt by the whole community. Some of the major dangerous outcomes of quarry mining in the Odzi area will be explained in detail in this sub-section. Participants who were selected to take part in the research were interviewed and all of them were recorded

4.4.1 Respiratory problems

Dust exposure from the mining sites has taken a high peek at the health of the people. Different machinery both small and heavy duty used at the mining site dangers of quarry mining. The quarrying activities generate dust that can lead to respiratory issues such as asthma, bronchitis, and other lung diseases. One of the interviewed miners at one of the sites sadly narrated how the tragedy lost his friend who suffered from respiratory problems as a result of the dust from the quarry mines. Although every miner must wear protective clothing at all costs, this rule is never followed, most of the miners have no protective clothing making them vulnerable at their workplaces. Some of the workers and residents are exposed to silica dust, which can cause silicosis, a serious lung disease. Some of the aged participants that were interviewed sadly narrated how the long-run effects of quarry mining have permanently affected their respiratory system.

4.2.2 Water-borne diseases

Contaminated water sources led to different water-borne diseases affecting the community. Runoff from mining operations can contaminate local water supplies, leading to waterborne diseases like cholera and dysentery. The locations of mines in the Odzi area are not specific, they vary. Some of these mines are located in mountains hence making the community vulnerable during rainy seasons from being affected by chemicals from the mines. With the assistance from the health workers who were interviewed, they were able to explain some of the challenges they deal with daily- dealing

with endless outbreaks of water-borne diseases. Their cry was that of adequate medication making their duties limited. Their recorded data shows that during rainy seasons, many people suffer from water-borne diseases regardless of age although children are more vulnerable. Some have died from these diseases and a large number seek medication from private health centres outside the Odzi area.

4.2.3 Noise-induced hearing loss

Continuous exposure to loud machinery and blasting can lead to permanent hearing loss among workers and nearby residents. Quarry mining requires blasting using noise machinery, which in turn has a huge effect on the hearing of the people. Both the miners and the community. Exposure to noise levels over a long time may cause harmful psychological effects. The detrimental effects of noise depend not only on its SPL and frequency (loudness) but also on the total duration of the exposure and the age, general health, and susceptibility of the individual. High-frequency noise is more harmful than low-frequency noise of the same level. Intermittent noise could be more harmful than continuous noise (Tripathy, 2008). One of the participants stated that they are very aware of the law that recommends them to always wear protective clothing when blasting but due to the need for high profits, they tend to ignore the law. The mines are not located far from residents. The daily blasting at the mining sites has led to chronic noise exposure and permanent hearing loss, especially for old people. There is no timetable for these mining activities, although rainy seasons reduce quarry mining activities. Daily blasting means daily noise to the residents at large. There is no soundproofing that reduces the noise.

4.2.4 Mental Health Issues

The disruption of community life and loss of land can lead to increased stress, anxiety, and other mental health issues. The increase in illegal quarry mining is now overlapping with land meant for residential use only. Due to political muscle, corruption, and other social links, some legal land occupants are being forcibly removed from their lands for illegal quarry mining leaving them suffering from stress and anxiety.

4.3 Chapter Summary

The above chapter presents the research findings, presentation, and analysis of all the participants involved in the research study. The findings of the demographical data of the participants were presented. The chapter presented research findings and analysis in a thematic way that corresponds with the research objectives. Issues on the negative impact of quarry mining on the health of the community in the Odzi were incisively discussed in the chapter. The subsequent chapter is the presentation of the study summary and conclusion as well as the model development

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter concludes the research topic on the impact of quarry mining on the health of the people in the Odzi area. Odzi is a township area located in Manicaland along the Harare-Mutare highway that is now well-known for mining activities. Proposed recommendations for the impact of quarry mining on the health of the people in the Odzi area have also been put forward.

5.2 Summary of findings

The previous chapters of this research dealt with different issues in trying to unfold the truth about the impact of quarry mining on the health of the people in the Odzi area. Interviews and other research methods were well applied and the results were all recorded. Although quarry mining has a negative impact almost throughout the year, research has shown that quarry mining endangers the health of people in rainy seasons. The study further identifies some notable effects of quarry mining on the health of the people in the Odzi community and some ways it affects the health of the people within the community. Overall, it is sufficient to conclude that the impact of quarry mining is rapidly increasing on the health of the people in the Odzi area located in Manicaland.

5.3 Conclusions of the study

This study aims to develop meaningful suggestions to minimise the impact of quarry mining on the health of the people in the Odzi area and a way to balance between exploiting the natural resources and the health of the community. The study reviews literature about the impact of quarry mining on the health of the people focusing on Odzi as the research area. It also reviews literature on the impact of quarry mining on the health of the people. In the Odzi community, quarry mining is dominating more than before. In a nutshell, the dangers of quarry mining are very common in the Odzi area.

5.4 Recommendations

Proposed Model/ Recommendations



The above-proposed model can be the solution to all the health issues affecting the Odzi community as a result of quarry mining. The Recommendations Model for The Impact of Quarry Mining on the Health of the People in the Odzi area aims to provide a holistic approach to reducing these impacts and promoting equitable mining practices that are health-friendly. The model takes into account the following key

- **Regulatory Compliance:** Ensure that quarry mining operations comply with environmental regulations and standards to minimise the release of harmful substances into the air and water. Some of these regulations are already in place, what is lacking is enforcement and compliance with the available regulations.
- **Health Monitoring:** Implement regular health monitoring programmes for workers and nearby residents to detect any potential health issues related to quarry mining. These

programmes must accommodate everyone who is directly or indirectly affected by quarry mining. Every group of people must be allowed to participate in these monitoring programmes. They help the stakeholders to know the available loopholes and possible solutions and help to minimise the danger before spreading it to the whole community. The health monitoring squad must have the power to shut down all mines that are not following the health regulations and putting the lives of other people at risk.

- **Community Engagement:** Engage with local communities to raise awareness about the potential health risks associated with quarry mining and to promote best practices for minimising those risks. This needs to be done more often depending on the period. In rainy seasons, this needs to be done regularly to alert the community.
- **Medical Facilities:** Provide access to cheap and affordable medical facilities and healthcare services for workers and nearby residents to address any health issues related to quarry mining. These services need to be readily available for the community.
- **Education and Training:** Educate and train workers and nearby residents on the potential health risks associated with quarry mining and on best practices for minimising those risks, and educate all the workers on the importance of wearing protective clothing at the workplace
- **Sustainable Practices:** Promote sustainable quarry mining practices that minimise the environmental and health impacts of mining operations. The use of machinery needs to be minimised to an extent that is well understandable and healthy-friendly. Working hours at the mining sites need to be reduced to give the nearby communities time to rest. Suggestions need to be made such as to blast during the day and do less noise extraction at night to give other people time to rest peacefully.

5.5 Chapter summary

An overview on possible recommendations that are a solution to the effects of quarry mining on the health of the people in Odzi area. The main issue behind this chapter was well-explained- to find possible solutions that can promote a balance between quarry mining in the Odzi area and the health of the community at large. From the discussions within this chapter, the recommendations require every individual within Odzi area to cooperate so as to reduce the impact of quarry mining on the health of the people.

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APPENDICES



All Communications to be addressed to the Chief Executive Officer

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SUBOFFICE

Box 958

Zimunya Township

MUTARE

REF: KC/157/13

12 June 2025

Monalisa Maide
Bindura University

Dear Madam

RE: REQUEST FOR PERMISSION TO CARRYOUT RESEARCH PROJECT IN MUTARE RURAL DISTRICT COUNCIL

Reference is made to your letter seeking authority to carryout a research in our Council on 'Impacts of quarry mining on the health of the people, the case of Odzi area'

We hereby grant you permission to undertake your research in our District under the following conditions:

1. You shall abide by the requirements of the Official Secrecy Act during the course of your research.
2. Information gathered shall be used for academic purposes only.
3. You shall avail a copy of your research to Council upon completion.

Yours faithfully

S.D CHINAKA
CHIEF EXECUTIVE OFFICER



I **Monalisa Maide** student number B2122018 do accept to carry out my research in Mutare District under the above conditions.