Management Gaps in the Implementation of Legislation Regulating Derelict and Ownerless Mines in South Africa

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Abstract

Little attention has been paid to the rehabilitation of derelict and ownerless mines in South Africa after their lifespan. This paper aims to explore management gaps in legislation that have resulted in the non-rehabilitation of derelict and ownerless mines in South Africa. There is growing evidence that supports the distressing effects of mining on people living around these mines in the North West Province. This paper was motivated by the current socio-economic status quo of old mining towns, the influx of illegal miners (Zama Zamas), severe environmental damages, and the violence associated with derelict mines.

Underpinning this research was an ecosystem approach and integrated resources management principles, which formed the foundation for the decision-making process.The researcher used a mixed-method approach and employed convergent techniques. A semi-structured instrument was used to collect data from 200 respondents. The results indicated that there is a dire need for community-based consultative processes, and an absence of clear guidelines for derelict and ownerless mines to pressure mine management to adhere to rehabilitation standards. Moreover, the mining charter is ambiguous regarding policy implementation, budgetary allocation, and duration of the rehabilitation of these mines.

The paper concluded that management challenges associated with derelict mines can be reduced if all stakeholders follow the guidelines as outlined in the environmental legislative framework (NEMA) of South Africa while being open to innovations in line with international best practices. It also contributes towards the development of guidelines for the management and implementation of legislation related to derelict and ownerless mines in South Africa from a philosophical, theoretical, and policy perspective.

Keywords

Legislation, management, environmental, abandoned mines, South Africa

Introduction

The lack of proper management and rehabilitation of derelict and ownerless mines worldwide has resulted in socio-economic and environmental problems in areas where they exist, of which immediate attention is needed. Furthermore, the weak mining regulatory systems coupled with poor management strategies for the rehabilitation of these mines have resulted in severe social, economic, and environmental challenges. Logan, Murphy, and Beale (2007) have observed the increasing number of derelict and ownerless mines in South Africa and a concern for the environment and humans, whilst Kloppers, Horn, and Visser, (2015) have explained that mine closure forms part of a mine's long-term planning towards the creation of sustainable living outcomes through the minimization of environmental, social, and economic impacts on host communities once mining has ceased.

Regrattably, the abundance of these mines in South Africa have reached an unprecedented level, which necessitates serious consideration and immediate rehabilitation. The non-rehabilitation of mines has continued to aggravate the living conditions of the surrounding communities. This paper explores the gaps in legislation for the management and rehabilitation of derelict and ownerless mines in South Africa. The premise is that the lack of a context-based framework by the South African government pertaining to the assignment of responsibilities, the potential costs (externalities) of rehabilitation, and the absence of uniform criteria and standards for the management and rehabilitation of derelict and ownerless mines (United Nations Environment Programme, 2019), lead to an increased number of derelict and ownerless mines in South Africa.

In the absence of a context-based framework for the management and rehabilitation of mines in South Africa, the country faces an increase in acid mine drainage flow, contamination of underground water, increased gang violence among illegal miners, drug and substance abuse, murders, and theft in communities surrounding these mines. The reason for the increasing number of derelict and ownerless mines in the country may be attributed to the existing management frameworks for mines in South Africa that do not explicitly state the processes to be followed in the rehabilitation of derelict mines (Unger et al., 2020) when compared to those of the leading mining countries, such as Australia and Canada. This has been confirmed in a report by the United Nations Environment Programme (UNEP, 2019), which found that the potential costs (externalities) of rehabilitation, the lack of a context-based framework with clearly assigned responsibilities, the absence of uniform criteria and standards for rehabilitation, and other related factors delay stakeholders, governments and communities to rehabilitate mines after they have reached the end of their lifespan in South Africa.

Swart, (2019) asserts that, although the Mineral and Petroleum Resources Development Act (MPRDA) 28 of 2002, the National Environmental Management Act (NEMA) 107 of 1998, the Framework for Mine Closure of 2018, the South African Constitution of 1996 as well as the common law, Minerals Act No 50 of 1991, the National Water Act (NWA) No 36 of 1998, and the Mine Health and Safety Act No 29 of 1996 are key pieces of legislation guiding mine closure in South Africa, they still leave major gaps in addressing the challenges of derelict and ownerless mines. Nonetheless, the changing developmental patterns and mining operations in South Africa compel mine stakeholders to respond quickly and rehabilitate mines once their lifespans are reached (World Bank, 2019). The changes in developmental patterns in South Africa since 1994 at social, economic, and political levels have led to many derelict and ownerless mines being abandoned without being rehabilitated. As a result, the number of these mines in South Africa is on the rise and poses serious concerns (Watson, 2019), as the challenges of poverty, inequality, and unemployment reach unprecedented levels. Furthermore, the lack of an explicit framework for the management and rehabilitation of derelict mines poses severe challenges in the communities that are situated around these mines (Van Druten and Bekker, 2017).

Research context

There is growing evidence of the after-effects of derelict and ownerless mines in communities and this is reflected in the socio-economic challenges of old mining towns, such as higher levels of poverty, starvation, poor housing conditions, and an increasing disease burden coupled with the influx of illegal miners searching for minerals through open shafts (Zama Zamas). Ledwaba and Mutemeri (2017) state that in South Africa, approximately 347 lives were lost between 2012 and 2016 due to the collapse of derelict mine shafts that are still being mined by illegal miners.

Furthermore, the Promotion of Access to Information Amendment Bill 31 of 2019 (PAIA) reported that 787 mine closure certificates were issued across the country between 2011 and 2016. Only 17% of these closure certificates were issued to mainstream mining companies and 83% went to prospecting rights, mining permits, or borrow pits as well as other work associated with highway construction. Whether these closure permits were issued after derelict mines were rehabilitated cannot be established, as the number of such mines is on the rise. A data-driven investigation from the Department of Mineral Resources and Energy (DMRE) shows that approximately R60 billion was budgeted for mine rehabilitation over the same period, but, to date, the funds remain unused to date. As such, the increasing number of derelict and ownerless mines in the country should raise concerns about the existing mining framework and the escalating costs for the management and rehabilitation of mines once they have reached the end of their lifespan (Brown, 2007; Nzimande and Chauke, 2012).

Mhlongo and Amponsah-Dacosta (2016), add that derelict and ownerless mines without rehabilitation escalate physical and environmental problems in their immediate communities, and according to UNESCO (2019), R60 billion (USD 29 billion) has been reserved for the rehabilitation of over 6000 derelict and ownerless mines in South Africa. However, the absence of a context-specific management framework that specifies clear rehabilitation standards, prioritization criteria, costing, and the presence of artisanal and small-scale mining (ASM) actors have hindered effective rehabilitation efforts.

This paper aims to explore gaps in the implementation of the existing legislative frameworks for the management of these mines in South Africa by conducting a critical review of the literature on theories underpinning the existing management frameworks for the rehabilitation of derelict and ownerless mines in South Africa. Furthermore, it aims to describe the implementation strategies of the existing management frameworks for the management and rehabilitation of mines in South Africa.

Literature review

Although the literature on the management and rehabilitation of derelict and ownerless mines in South Africa is limited, the existing mining charter defines derelict and ownerless sites as 'mines where mining leases or titles no longer exist; and the responsibility for rehabilitation cannot be allocated to any individual, company or organization responsible for the original mining activities' (MCMPR/MCA 2010). Furthermore, there is no official global inventory for them, but countries such as Canada, Brazil, Germany, and Australia are leading the way in the creation of an inventory (Unger et al., 2015).

In South Africa, the existing management frameworks for mines compared to those of the leading mining countries around the world do not explicitly state the processes that must be followed in the rehabilitation of derelict and ownerless mines (Unger et al., 2020). This is the case despite Sections 28 and 24 R (1) of the National Environmental Management Act 107 of 1998 (NEMA) and Section 34(a) of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) stating that 'the mining right holder retains responsibility for derelict mines until the Minister of Mineral Resources (MMR) issues them with a closure certificate' (Klopper and Wessel, 2017). These sections stipulate that the mining right holder takes responsibility for environmental liability, pollution, ecological degradation, and the management thereof but not the socio-economic (externalities) liabilities posed by these mines to surrounding communities (Alberts et al., 2017). Furthermore, these legislations fail to explicitly specify the management processes for, and the timeframe within which the responsible stakeholders must rehabilitate mines after the lifespan is reached before a certificate of closure is issued.

The ever-increasing illegal activities in unsafe, derelict, and ownerless mine shafts caused by illegal miners (Zama-Zamas), and the growing evidence that the effects of these mines on the living conditions of people in communities close to these deteriorating mines are worrisome. Before the passing into law of

the Minerals Act of 1991, many mining companies according to Swart (2003) 'used irresponsible mining methods with no regard towards protecting the environment and had often shirked their responsibility towards environmental rehabilitation by leaving an area unrehabilitated before they are being liquidated or leaving the country'.

Furthermore, the constant iterations and amendments in the current management framework for the rehabilitation of mines, the deletion of Sections 38 to 42 of the Mineral and Petroleum Resources Development Act (MPRDA) of 2002, which dealt with environmental governance, and the none-replacement of the deleted section under the National Environmental Management Act (NEMA), which resulted in a major gap in environmental legislation, are of serious concern. Moreover, the government continues to ignore this gap, and the effects on communities around disused mines are worsening.

Despite the United Nations Environment Programme (UNEP, 2019) report, that stresses the potential costs of none-rehabilitation, the lack of clearly assigned responsibilities, the absence of criteria and standards of rehabilitation, as well as other factors have delayed action by all parties. These parties are, in particular, being industry, governments, and communities in the past, given the changing developmental patterns in South Africa. The MPDRA Amendment Bill in the 2013 regulatory framework neither makes provision for cases of derelict and ownerless mines, nor does the legislation delegate due responsibility or have an approved strategic plan for their rehabilitation. An additional challenge in governing mine closure is the fact that the impact of mining cuts across the authorities of several government departments, all of whom are bound to play an important role in the management of legislation (Van Tonder et al., 2009). The shortage of relevant mine closure skills and knowledge within the regulator is a major concern as well as reason for the unsuccessful closure. This is a major gap in the management and rehabilitation of disused mines in South Africa.

Moreover, the Mining Charter III is also seen as a regulatory instrument rather than a framework aimed at incorporating socio-economic challenges as an inclusion in the management and rehabilitation of derelict and ownerless mines in this framework (Moodley, 2019). The mining charter does not provide policy implementation, budgetary, and timeframe guidelines for the rehabilitation of these mines and therefore leaves serious gaps because it fails to make provision for a time-bounded deadline. This has resulted in delays in the rehabilitation programme and consequently harms the communities where derelict and ownerless mines are situated. Matshusa (2017) are of the view that existing mine owners and host communities are central in the management processes and rehabilitation of mines after the end of its lifespan is reached. Despite the limitations in the existing frameworks, there are two frameworks enacted by the South African government designed to combat the problems associated with the management of mines in South Africa, i.e., the National Environment Management Act (NEMA) and the Mineral and Petroleum Resources Development Act (MPRDA).

The National Environment Management Act (NEMA) 107 of 1998

The NEMA Act provides for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that promote cooperative governance, and procedures for coordinating environmental functions exercised by organs of the state (NEMA, 1998). However, the NEMA Act, 2003 (Act No. 46 of 2003) only deals with compliance and enforcement and provides for Environmental Management Inspectors (EMIs). The act therefore aligns environmental requirements in the MPRDA 8 of 2002 with NEMA (1998). All NEMA amendments (2003, 2008, and 2009) concentrate on environmental conservation, rather than processes of rehabilitation and closure of the disused mines. Therefore, the framework does not specify the management framework processes for mine closure and how the effects can be mitigated in the surrounding communities where derelict and ownerless mines are located.

Mineral and Petroleum Resources Development Act (MPRDA) 28 of 2002

Several amendments have been made to the MPRDA, of which the mission was to provide equitable access to sustainable development of South Africa's mineral and petroleum resources. According to Swart (2003), the MPRDA 2002 provides a holistic cradle-to-grave approach to prospecting and mining, and fully internalizing economic, social, and environmental costs to achieve sustainable development in mineral resources. This act determines that such an application must include information about the name of the applicant applying for a closure certificate, the number of the permission, permit, or right in the region within which mine activities occur, the type of permission, permit, or the right type of mineral(s) details of land, area or offshore license block, and the reason for the application for a closure certificate.

Mining Charter, 2018

The Mining Charter, 2018, was derived from the Mineral and Petroleum Resources Development Act of 2002 (MPRDA Act No. 28 of 2002). The charter is an important instrument in creating governance certainty, sustainable growth, and a changed mining industry. However, the charter fails to address the issue of management and rehabilitation of derelict and ownerless mines, although it provides for procedures and processes for issuing of licenses and beneficiation. The charter does not provide for policy implementation, budget, and a timeframe to work on the rehabilitation of derelict and ownerless mines.

Research methodology

The researcher followed a mono-method research approach, similar to that of Leedy and Ormrod (2016), who opined that research gaps associated with the development of a framework are complex. Since this paper intends to fill in the gaps in the existing legislation for the management and rehabilitation of derelict and ownerless mines in South Africa, a mono-method research approach was appropriate. The philosophical assumptions that underpin the research question and the research problem are premised on an ontological view for the collection of data in the development of a framework for the management and rehabilitation of derelict and ownerless mines. The researcher utilized existing literature as a foundation for determining constructs that are key when developing a framework for the management and rehabilitation of these mines. The research design implemented was an exploratory sequential design and participants were purposively identified and face-to-face interviews conducted. The same persons in this paper were determined by saturation plus two participants. Qualitative data from interviews were analysed and interpreted using a thematic method of analysis, and Atlas.it was used as a tool to qualitatively analyse the data.

Analysis and results

During analysis, there was consensus among participant groups in response to gaps in the legislation for the management and rehabilitation of derelict and ownerless mines. The focus groups observed the deleterious challenges and gaps in legislation and concluded that the worsening socio-economic conditions in communities surrounding these mines pose serious threats to humans, animals, and the environment. The common themes and quotes that emerged from participants were:

When questioned about the challenges relating to derelict and ownerless mines and how they have affected the lives of community members and their business operations, Participant *ENT02 replied: "In my view, the challenges that we are facing as a community include mine pollution and toxic contaminated water sources and air. People are drinking contaminated water, and this is dangerous to the residents. Acid mine drainage from these mines is changing the water quality and causing health hazards to humans, animals, and fish destroying our livelihood." Code FMS02 said: "There is a challenge of cooperation by stakeholders, government, industry, communities, and environmental groups in creating a lasting solution to manage and rehabilitate derelict and ownerless mines in South Africa."Code CNR02 said: "I think there are challenges of changes in legislation as well as an exodus of senior management from the mining ministry to other places looking for greener pastures. This is affecting the way projects of rehabilitation take place."Code BLS02 said: "There is inadequate funding and cash flow management, which is a major challenge to the management and rehabilitation of derelict and ownerless mines*".

Furthermore, participants were asked to respond to the shortcomings in the legislation that have resulted in the poor management of disused mines resulting in their non-rehabilitation in South Africa. Participant CNR02 states that: "*There are shortcomings that have been identified concerning the rehabilitation of existing mine closure practices in the country. These include a lack of community consultation and monitoring of post-closure activities. To be honest, communities have not been consulted to ensure their wholehearted contribution and participation in the management and rehabilitation process of abandoned mines*". Code BSL02 said: "*There is inadequate social impact assessment when it comes to rehabilitation of mines. More emphasis is placed on the environment than the surrounding communities. This highlighted a negation in the entire process of mine rehabilitation". Code LPS02 said: "There is a lack of information about the monitoring of social and economic conditions in connection with the community to be affected by these mines".*

A question was posed whether 'mine rehabilitation is inclusive of all possible domains'. The following is an extract from participants. Code BLS01 said: "*I have felt strongly that there are loopholes in the way government tackles the issue of rehabilitation of mines. Community engagement in the development of mine closure, rehabilitation, and decommissioning are some of the loopholes that require immediate attention for comprehensive closure and rehabilitation*".

Furthermore, questions regarding the policies and strategies that have been put in place to ensure current mining organizations do not fall into the trap of no clear processes to rehabilitate derelict and ownerless miners resulted in the following responses: *Code BLS01 said: "The government drafted two important legislative frameworks (NEMA Act and MPRDA Act) that bind current miners in the environmental aspects concerned with the closure and rehabilitation. This is a great leap in the fight to minimize derelict and ownerless mines. If properly followed with enough resources, the government will win this war". Code CNR02 said: "What I know is that the government of South Africa established the Council for Geoscience, scientific research contracted by the Department of Mineral Resources (DMR) to manage the ownerless and derelict mines database. This body should up the pace and make sure that all derelict and ownerless mines are closed and rehabilitated*".

Further questions to participants concerned challenges relating to the rehabilitation of derelict and ownerless mines and possible suggestions on the way forward to ensure a sustainable solution to the problem. Direct quotes from frespondents were: Code BLS02 said: "*In my view, the only way to decipher these problems is to follow the environmental legislative framework (NEMA and MPRDA) to the letter and leave space for innovativeness in line with international best practices. Failure to adhere to the environmental legislative framework will result in severe challenges looking at the way Zama-Zamas are infiltrating these mines in search of fortune". Code EMS02 asserted that: "There should be enough budgets to counter the problems head-on". Code CNR02 indicated: "I honestly feel aggrieved by these daily challenges. I think there should be teamwork by all stakeholders involved to come up with sustainable solutions rather than leaving everything in the hands of the government. It seems the burden is too much for the government and they have run out of ideas. Strategic decisions related to management and rehabilitation should come from all angles and be implemented*".

Additional questions posed involved the responsible stakeholder for the costs of rehabilitation of derelict and ownerless mines in South Africa. The participants made the following verbatim statements: *Code BLS02 said: "In my view, the management and rehabilitation of derelict and ownerless mines in South Africa is a complex issue given the time these mines have been in existence and lies in the hands of the government. It is the government's prerogative to make sure that all derelict and ownerless mines are closed to perfection". Code CNR02 said: "As far as I know the government bears the financial responsibility since it is the institution that should have ensured that there are policies and regulations in place to prevent mine abandonment". Code EMS02 said: "I strongly feel that the government's Department of Mine Environmental Management through a programme called Mineral Policy and Promotion is responsible for the management and rehabilitation of derelict and ownerless mines in South Africa". Code TCTS02 said: "There is a need for a collaborative effort from all stakeholders than to let the government go at it alone. The minerals department could use other legislative tools to pursue previous holders of mining rights who caused environmental damage under the pre-MPRDA framework*".

A description to establish the management gaps in the legislation for the management and rehabilitation of disused mines was performed using a description data analysis process. Findings from the analysis are presented in Table 1.

From the analysis, the described variables include public empowerment, which after performing factor analysis on the opinions of owners about the public being empowered with the knowledge to establish or make decisions about the rehabilitation of abandoned mines being considered. The implications are that there were gaps in the existing policies and legislation. These gaps were mostly regarding issues of land and water resources that are not being protected when derelict mines are left unrehabilitated.

Regarding the effectiveness of the Environmental Management Frameworks for South Africa, factor analysis was conducted on how effective the environmental management framework outcomes have been in the broader decision-making in the context of management

Table I

Descriptive analysis of gaps in legislation for disused mine rehabilitation in South Africa

Factors	N	Mean/standard deviation
Public empowerment	139	3.58 +/-1.063
Effectiveness of Environmental Management Framework	139	3.47 +/-1.346
Rate of threats	139	1.57 +/-0.733
Significant risk of derelict and ownerless mines	139	2.310 +/-1.498

Source: Own Source

and rehabilitation of derelict and ownerless mines in South Africa. The results indicated that this framework was not effective and the reason was the increase and persistence in the number of environmental problems that are still affecting communities surrounding derelict and ownerless mines that have not been rehabilitated.

Furthermore, a rating of the threats posed by derelict and ownerless mines that have not been rehabilitated was performed. Factors included were safety, health, and environment. Results revealed the ineffectiveness of existing legislation in the management and rehabilitation of existing mines in South Africa.

Discussion of findings

The gaps in existing legislation and policy for the management and rehabilitation of disused mines were highlighted by participants, indicating confusionsurrounding policies and legislation with no clear responsibility as to who should manage and rehabilitate these mines in South Africa. This research has shown that policies and legislations relating to the management and rehabilitation of derelict and ownerless mines seldom consider the community's views or capacitate communities to make informed decisions. This was confirmed in an earlier study by Miralas et al. (2014), who found that "the none-participation of all stakeholders in the management and development of legislations regarding mine closure speaks to a broader inadequacy in strategic planning, technical capacity and a cooperative approach that need to be underpinned by sustainability principles." Although there is a need for the government to enhance forensic auditing to ensure that there is financial prudence in allocating funds for the management and rehabilitation of derelict and ownerless mines, the surge in challenges associated with derelict mines and its effects on the daily lives of community members poses severe endangerment of human safety. This paper has established that the principal failure by stakeholders to properly manage and rehabilitate mines is due to gaps in the existing frameworks.

As mentioned in the literature review, thorough investigation into the involvement of communities as mentioned in the literature review in the decision-making process relating to the management and rehabilitation of derelict and ownerless mines points to the dire need for the formation of a community-based consultative process to ensure inclusivity when developing legislation and policies for the management of disused abandoned mines in South Africa. Furthermore, the depth of information about the monitoring of social and economic conditions of communities surrounding the derelict and ownerless mines is limited. As such, monitoring of, and consultation regarding the processes that should be involved, policy development, and legislation pertaining to the management and rehabilitation of derelict mines is encouraged. Such an inclusive process will guarantee that the rehabilitation process enhances the community's capability to understand the processes, and ensures that the responsible stakeholders manage and rehabilitate mines before closure certificates are issued. The emphasis should be on the surrounding communities, rather than the environment as Kabir et al. (2015) argue that the monitoring of social indicators is more difficult than those relating to the physical environment.

The findings of this research have demonstrated that there are gaps in the policies and legislation developed by the government for the management and rehabilitation of derelict and ownerless mines in South Africa. This research may contribute to the current literature since, to date, there have been and are no recent studies about the management and rehabilitation of derelict and ownerless mines in South Africa. Furthermore, community engagement in the development of mine closure, rehabilitation, and decommissioning were cited as loopholes that call for immediate attention to a comprehensive framework for the management and rehabilitation of decommissioned mines. It seems clear that the current legislation and policies are highly fragmented and do not directly or comprehensively address the problem of the rehabilitation of derelict and ownerless mines across South Africa. This research has, to some extent, provided the foundation for a new comprehensive framework for the management and rehabilitation of derelict and ownerless abandoned mines, which includes a shared responsibility and cost-sharing between stakeholders. The management and rehabilitation of mines are a universal problem and not the responsibility of one entity, but the total responsibility in South Africa currently seems to be that of the government only. This paper establishes a basis for the development of a framework whereby the responsibility to reduce the negative impact of these derelict mines on the environment, specifically the management and rehabilitation thereof, is shared between communities, mining houses, and the government.

The current legislation in South Africa, which is the MPRDA Act 28 of 2002, Section 28, states that "every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorized by law or cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment". This extract shows the extent to which the Act fails to allocate responsibilities amongst stakeholders when it comes to the management and rehabilitation of mines. As such, the government seems to have to bear the sole financial responsibility, since the institutions (mining organizations and communities) that should have ensured that there are policies and regulations in place to prevent total neglect or mine

abandonment, cannot be located or held accountable. Although the government of South Africa has recently drafted two important pieces of legislation (NEMA and MPRDA) as policies to guide the processes in the management and rehabilitation of mines, concerns are that they are not comprehensive and focused enough to prevent the increasing number of derelict and ownerless mines in South Africa.

Conclusion

The gaps in the legislative framework for the management and rehabilitation of derelict and ownerless mines in South Africa need to be addressed with the urgency it deserves. This is clear from the interviews conducted and the data gathered from all stakeholders involved in this study. It is recommended that the government speeds up the process of developing a strategic plan for the implementation of policies and legislation regarding the rehabilitation of abandoned mines to minimize the risks it poses to communities and the environment at large. Policy implementation, community consultation, inadequate social impact assessment, commitment at the highest political level, lack of clearly assigned responsibilities, the absence of criteria and standards of rehabilitation for these mines, the none prioritization of rehabilitation, and omission of Sections 38-42 were cited as some of the gaps in the implementation strategies. Stakeholders should be involved throughout all the stages of mine rehabilitation because this may assist in the development of appropriate management options for the site. This paper has shed light on the lack of targeted legislation and policies by the government and responsible parties, involving the management and rehabilitation of derelict and ownerless mines, which have resulted in worsening socio-economic conditions of the surrounding communities of these mines.

Recommendations

This research therefore recommends that a community-based consultative process be prioritized when developing policies and legislation about the rehabilitation of derelict and ownerless mines in South Africa. Such a process would ensure that all parties contribute effectively towards the closure and rehabilitation of these mines. Furthermore, it is recommended that any new Mining Charter should provide an implementation action plan, budget, and timeframe for the management and rehabilitation of derelict and ownerless mines. Failure to institute timelines as a key pillar may delay the rehabilitation process. The omission of Sections 38-42 of the NEMA Act of 2002 should be addressed and documented for the complete closure of these mines. The government and all other identified stakeholders areencouraged to collaborate to combat the illegal takeover of ownerless mine shafts and to develop a one-stop comprehensive framework for the management and rehabilitation of derelict and ownerless mines in South Africa.

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Suggested areas for further studies

During an extensive review of the available literature, it was found that studies on policy implementation strategies for legislation that aims to address the management and rehabilitation of derelict and ownerless mines in South Africa are lacking. This may possibly be the reason for the persistent problems currently being experienced in the country.

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