

AMD and the Mining Sector Contribution to the South African Economy

Abstract

Debate on how to make the mining sector in South Africa benefit more people and subsequently enhance the sector's contribution to national development has tended to ignore that mining activities have negative effects to society. These negative effects, which economists broadly refer to as negative externalities of production, are important in assessing the short term and long term benefits of mining activities. Without taking into account the externalities, the sector's contribution to the country's economy is likely to be exaggerated. The chapter discusses the performance and contribution of the mining sector to the South African economy taking into account the negative externality element of the Acid Mine Drainage (AMD). It makes the case that profit and production levels for the sector have been kept higher than the optimal levels as a result of not taking into account the AMD. It suggests that this aspect need to be the acknowledged in national policy debates and in policy formulation aimed at sustaining the country's benefit from mining activities. Otherwise the current and future contribution of mining to the local economy will remain distorted.

1. Introduction

The contribution of the mining sector to the South African economy while taking into account the effects of Acid Mine Drainage (AMD) is part of the wider subject of how to increase the country's benefit from its natural resources. Many countries on the African continent that are endowed with natural resources have not been able to leverage the resources for their national development. In fact, the existence of natural resources has ended up being considered a curse to a number of natural-resource rich countries like Nigeria, Sierra Leon, and Congo DRC among others [1].

There is renewed interest on how Africa should exploit its resource in ways that benefit more Africans. The African Union established a special division responsible for mineral and mineral beneficiation on the continent. The division focuses on undertaking research and providing knowledge on development options for the continent using its natural resources [2]. The desire to increase the continent's benefit using its natural resources further led to the formulation of the Africa Mining Visions (AMV) in 2008 [3]. At the centre of AMW is the triggering of development on the continent and the eradication of poverty using natural resources.

Specific to South Africa, organised labour and some political parties continue to claim that the country is not getting the best dividends from its national resources. Despite the mining sector contributing almost 5% to the country's GDP [4], there is a general feeling that the distribution of the benefits from mining are skewed in favour of the mining houses. As a result, recent policy debates have focussed on how to increase the mining sector contribution to the country's economy and making sure that more South Africans realise benefits from this sector.

The pre-occupation with mining sector's contribution to the economy has tended to focus on short-term performance. Current performance parameters such as the sector's production, employment, productivity, and wage levels have dominated policy debates on the sector. Little attention has been paid to the fact that maximising current performance and benefits therefrom does have a trade-off in terms of future sector contribution to the country's economy and benefit to society.

Inequality and high levels of unemployment remain prevalent in South Africa despite its transition to democratic governance in 1994 and the commitment of the democratic government to address the

socio-economic imbalances of the past. The country needs to come up with creative and yet practical ways to get more people out of poverty. Using its natural resource endowment to create jobs for its citizens thereby enabling them to have some income, is one of the way the country can lessen the plight of many disenfranchised poor people. Otherwise, there is a risk that the continued economic exclusion of many South Africans from active and beneficial participation in local economic activities may result into political unrest.

Natural resource are exhaustible and in the process of their exploitation they often have an adverse effect to the environment. Mining in particular, pollutes the air and the ground during the active years of mining. Further, mining activities have specific life span, after which a mines closes. This leaves mining communities with no employment opportunities, yet still carrying the environmental burden of the ceased mining activities. It is prudent that in assessing the contribution of the mining sector to the country's economy, and in the coming of up with ways through which this contribution can be enhanced in future, the adverse effects of mining to environment are taken into account.

The focus of this chapter is the issue of Acid Mine Drainage (AMD) emanating from mining activities and its implication to the mining sector's contribution to the South African economy in the short and long term period. Section 2 discusses AMD in the context of production externalities and their subsequent effect on production and employment levels in general. Section 3 analyses the mining sector's contribution to the economy in isolation of the AMD and later while taking into account the AMD problem. Contemporary challenges of the South African mining sector in the Context of AMD problem are discussed in section 4. Section 5 concludes and makes recommendation on managing the problem of AMD against the country's need to enhance the mining sector's contribution to its short term and long terms socio-economic development needs.

2. AMD in the context of production externalities

Production is central to realising economic growth and benefits therefrom. For a long time, economists have devoted time and effort to understand what drives production and its effects to the economy where it takes place.

In analysing consequences of production, it is important to identify both its positive and negative effects to society. Often, the tendency is focus on the positive outcomes that are directly realisable by parties engaged in the production process. The undesirable and indirect consequences of production are seldom acknowledged. This lack of acknowledgment may be intentional or unintentional; nonetheless, it has fundamental implications on production decisions and the impact of production to society. The indirect effects of production are generally referred to as externalities of production.

The existence of production externalities creates a situation where societal interests are not fully taken into account when making production decisions. The externalities distort costs and benefits of production as perceived by producing agent.

Positive externalities occurs when there is positive but indirect benefits to society emanating from production. With positive production externalities, the monetary benefit realised by the producers will be less than the optimal, as part of it goes indirectly to society. Despite creating this benefit to society, the producers cannot charge for it because it is indirect, and most cases it takes the form of a public good or service.

A profit maximising producer makes production decisions based on the actual benefit realisable from undertaking production. With the existence of positive externalities of production, producers will

underestimate benefits of their production and will subsequently produce at levels lower than the optimal.

Following the same logic, the existence of negative externalities of production will lead to over production. Producers will tend to underestimate the cost of production, consequently overestimating their profits. The private cost of production as experienced by the agent will be lower than social cost of production as the latter will include both the private cost of production as well as cost to society. Motivated by higher profits, producers will produce more than what is desirable to society.

The existence of production externalities creates a classic case of market failure, a situation where if markets are left to operate without any external influence, they fail to simultaneously maximise the interest of the producers and that of the consumers. The ability of markets to lead to optimal production and consumption outcomes is one of the fundamental reasons put forward by free-market advocates to discourage state and external interventions in production and consumption decisions.

Acid Mine Drainage constitutes a negative production externality of mining. Its impact is not directly realised by the mining houses and yet it negatively affects society. To make matters worse, the AMD effect to society is deferred to a future date. So, apart from mining houses not incurring the full cost of AMD, society too takes time to recognise that it was being affected by the mining activity. This creates a situation whereby the mining houses and the society do not give the problem of AMD the necessary attention in the short time.

At a policy level, though, there is a partial recognition of AMD as a negative externality of mining. This is reflected in policies and legislations which include clauses on safeguarding the environment, in general, during and after the mining period.

Under the new legislation, for example, mining houses have to submit an Environment Management Programme Report (EMPr) to government to receive mining licences. It is a requirement of EMPr that mines clearly state the impact of their activities to the environment and the resources they are committing, in advance, to address the adverse impact of their activities to the environment [5].

It should be noted though that the South Africa government has not been effective in using legislation to achieve desired socio-economic objective in the mining sector. Alder et al [6] attribute the inability of government to implement the well-intended legislations in the mining sector to insufficient specificity and intergovernmental disagreements about which policies are primary. In some cases, legislations cut across departments, creation uncertainty of which department is the custodian and the enforcer of particular legislations. The Department of Mineral Resources, the Department of Water Affairs and the Department of Trade and Industry are at the centre of this confusion. The situation is exacerbated by formulation and enforcement roles between the national and provincial governments. Whereas the national government is empowered to regulate issues pertaining to the environment, local governments are tasked with the enforcement of environmental legislations. This has created a disjoint in the interpretation, implementation and enforcing of the legislations pertaining to mining and the environment [7].

Specific to the AMD, three aspects have made it hard to the use of legislation to limit its occurrence and forcing mining houses to internalise its mitigation costs. The three factors are: a) information asymmetry between mining houses and government, b) incomplete contracting as a result making a contract on aspects that may only manifest themselves at a future date, and c) methodological limitations in estimating the cost of AMD.

The legislation broadly requires that mining houses commit themselves to protect the environment including guarding against AMD. Mining houses are obliged to budget and put aside resources that will cover the cost of predicted environmental rehabilitation as a result of their mining activities. Although a good initiative, government as the enforcer of the legislation, cannot predict with accuracy the extent of damage to environment likely to emanate from specific mining undertakings. It has to depend on the mining houses to provide it with such information. The situation gives the mining houses a choice to decide what type of information and in what form to avail to government. Since government adjudicates the offer of mining licences based on this information, it is unlikely that mining houses will provide information that escalate their liability in terms of environmental protection and rehabilitation costs. The information asymmetry between government and mining houses on the generation of AMD and its mitigation costs favours the mining houses. It puts government in a very weak position in enforcing the applicable legislation.

The commitments that are made between the mining houses and government, as per the legislation, are future-based. Characteristic of future contracting, a number of assumptions have to be made about the future when contracting. For example, it is often assumed that the mining practises adopted at the start of the mining undertaking will be maintained. However, mining processes can be changed by the mining houses in due course in an attempt to minimise production costs. If this happens, the extent of AMD generation as result of a particular mining undertaking will change. Government cannot anticipated such changes at point of issuing the mining licence.

Sometimes, the full extent of AMD pollution can only be ascertained many years after the culpable mine has closed business. In such cases, it is impractical to compel a closed mine to undertake remedial actions to mitigate the costs of its AMD pollution.

It is probable that efforts to force mines to internalise AMD costs in their production decisions, through legislation, may not achieve the desired objective in entirety due to the legislation enforcing challenges explained above. Both production and employment levels are likely to continue to be at suboptimal levels. The existence of the legislation cannot completely eliminate the AMD effect on mining houses production, but it reduces the level of distortion when making the production decisions.

3. The mining sector contribution to the SA economy in the context of AMD

First, the section assesses the contribution of the mining sector to the South African economy in isolation of the AMD and any other negative production externalities. Thereafter it discusses implication of introducing concerns pertaining to the AMD to the sector's contribution to the national economy.

The mining sector contribution to the SA economy in isolation of AMD

South Africa is rich in mineral resources and a major player in mineral trading globally. The mining sector has played a pivotal role in the country's socio-economic development path through job creation and corporate social responsibility projects. The sector has also contributed to the transformation of the country into being the most industrialised country on the African continent [8].

The following discussions are based on secondary data from the South African Reserve Bank (SARB), Statistics South Africa (Stats SA), the Chamber of Mines and Department of Mineral Resources. Data was triangulated between the four sources to minimise bias and increase credibility of conclusions made therefrom.

The South African Reserve bank monitors and keeps track of economic performance at sectoral levels through periodic surveys. Its database, provides an important source of secondary data on sector contribution towards the country's GDP. The Department of Mineral Resources (DMR) keeps record of employment levels in the mining sector on a year-to-year basis.

The Chamber of Mines (COM) collects data from the employers in the mining sector and compiles sector's financial performance facts and figures. The CMO analyses the mining sector's contribution to the country's economy from the perspective of employers. Statistics South Africa also conducts quarterly sector-performance surveys. The National Treasury, on the other hand, keeps record of estimates of revenue from different sectors of the economy. These four sources combined, provided good secondary data to assess how the mining sector has been contributing to the South African economy. The ensuing sections divulges into more details on the specific contributions.

Contribution to Gross Domestic Product

The Gross Domestic Product (GDP) is an important indicator of the performance of any economy. It presents the total sum of all goods and services produced within a country in a particular year. As such, it is indicative of revenues received by participants in economic activities. In a perfect economy, therefore, GDP is correlated with the well-being of the citizens of the particular country.

The overall contribution of the sector to the country's GDP, in absolute terms, between 2003 and 2013 was estimated at over R2.1 trillion [9].

In rand terms, the sector contributed R330,090 million, R331,080 million and R288,702 million to national GDP in 2010, 2011 and 2012 financial years respectively. Considered in percentage contribution terms, the mining sector contributed 4.9 percent to South Africa's GDP in 2012 [10].

Overall, the sector's contribution to the country's GDP remain reasonable although fluctuating over time. For example, the sector contributed 2.7 per cent and 11.5 per cent to national GDP in 2002 and 2005 respectively [11].

The slow recovery from the global recession experienced in the mid-2000s, falling commodity prices, unstable foreign exchange rates and labour unrest domestically are some of the reasons to which instability in the sector's contribution to national GDP is attributed.

Nevertheless, the mining sector remains one of the ten most important sectors of the South African economy.

Employment

One of the direct ways through which an economic sector can improve the livelihood of the citizens of a country is through employment. Employment enables a section of society to receive income which it can use to improve the well-being of the recipient and recipient's dependants. Employment is therefore an important parameter in assessing a particular sector's contribution to the socio-economic needs of a country.

The mining sector has been an important employer in South Africa for a long period of time. In isolation of the gold mining subsector, sector employment has been growing, though slowly, for the last 10 years [12]. In 2011 sector employment passed the threshold of 500,000 head count (Table 1).

Table 1: Employment in South African mining sector: 2003-2012

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Employment	435,628	448,909	444,132	456,337	495,150	518,729	491,794	498,906	512,878	524,632

Source: DMR, 2013

Employment in the sector has been relatively lower than that of the trade and the manufacturing sectors [12], but the sector remains important in terms job creation potential.

The sector employment figures do not capture the nature or quality of employment. Divulging into details of the nature of employment created by the sector may unearth interesting findings and can change opinion regarding the extent to which the sector is contribution towards job creation in the country. This analysis, however, is outside the scope of this section.

Direct Tax

Tax provides away to redistribute a country's wealth to citizen who may not be directly involved in a particular economic activity that generates wealth. The redistributive role of government is particularly relevant to South Africa given the number of people that were deliberately denied to participate in economic activities during apartheid era.

The developmental state model, which is advocated for in the country's National Development Plan (NDP) requires that the country has enough resources at its disposal to influence the provision of goods and services that are critical improvement of the welfare of those disadvantage by the market forces in society. Through its contribution to the country's revenue pool via taxes and royalties, the mining sector enables the government, to some extent, to implement its developmental state agenda.

Data on the exact amount of direct taxes paid by mining house to the county's fiscus was not readily available. It terms royalties, the sector contributed R4.4 billion, R5.6 billion and R5 billion in 2011, 2012 and 2013 financial years respectively [13].

The sector contribution to national revenue pool has been significant. With careful planning and proper utilisation of the contributions, the country can make substantial positive change in the lives of many South Africans.

Foreign Exchange Earnings

Trading with the external worlds allows a country to access resources outside its territorial borders for the benefit of its citizens. Foreign exchange earnings are one of the indicators of the extent to which a trading country is benefiting from external trade.

Between 2003 and 2013, foreign exchange earnings from the mining sector trading activities were estimated at R2.16 trillion [14]. The sector contributed 50 percent of the country's foreign exchange earnings in 2012 [15].

In all, the South African mining sector, in isolation of AMD concerns, continue to contribute positively to the local economy. Through job creation, forex earnings and general contribution to government revenue, is a source of livelihood to a number of South Africans. The Chamber of Mines summaries the sector's contribution to the local economy between 2003 and 2013 as follows: sales revenue –

R2.9 trillion, export earnings – R2.2 trillion, GDP – R2.1 trillion, employee remuneration – R706 billion and fixed investment – R548 billion [16].

The extent of its future contribution is uncertain though given the fluctuation in commodity prices, instability in the local labour market and mine closures. A new mining legislation to be soon introduced may also have a bearing on the sector contribution to the domestic economy in the future which is undeterminable at moment.

Implications of the AMD to Mining Sector Contribution to SA Economy

Assessing the extent to which the AMD problem has and can affect mining output and job creation in the country can be a useful way to adjudicate the AMD impact on the South African economy. Mining output has a direct impact on the country's GDP, while employment in the sector increases disposable incomes in the local economy. When disposable income increase, the country's GDP increases through a multiplier process.

In economic terms, AMD is a negative externality of production. Negative production externalities results into over production or producing of goods or services beyond the optimal levels. The existence of negative production externalities leads economic agents to underestimate the real cost of production as alluded to previously. In the mining sector, this translates into over-exploitation of mineral resources in the short-term while ignoring future costs. Although the over-exploitation may have a positive effect on employment in the short-term, it does not guarantee that these jobs will be maintained in future.

The direct effect of the AMD problem to the contribution of the mining sector to the country's economy has been to keep sector profit and production levels higher than the optimal levels. The status quo is not sustainable in the long term. With the internalisation of mitigation costs of AMD, profit margins will reduce which will in turn negatively affect sector production and subsequently employment in the sector.

Balancing between immediate and future benefits from the mining sector

South Africa should be clear about the mining development model it wants to adopt. Mining by default has an adverse effect to environment but that does not mean that mining needs to be stop. Conscious decisions have to be made on how to get the right balance between engaging in mining as a means towards national development and protecting the environment. In intertemporal terms, a decision has to be made on how much pollution will be acceptable now against pollution acceptable in future.

China was propelled to faster rate of economic growth by ignoring some of the environmental concerns of mining in short term. Although China came up with environmental protection law as far back as 1979, its effective implementation started in 2003 [17]. Within this period, the implicit policy stance followed by the country seemed to be 'development first and environmental concerns latter'. The Chinese government pursued economic growth with less concern on environmental issues across board.

What is not disputable from China's experience is that the country was able to achieve its economic growth objective. It is within the later years that the China started putting visible effort in minimising the adverse effects of mining to environment and cleaning up the pollution of past mining activities.

A key difference between South Africa and China in terms of the 'development first and environmental concerns latter' approach relates to ownership of the mines. For a long time, most of the mining firms in China were state owned [18]. Even after the restructuring of the mining sector in 1980s that allowed foreign firms stakes in the local mining sector, joint ventures between the state and private companies remained prevalent [19].

With the state being an active participant in mining, the burden for future mitigation can be planned even when the mining activities have ceased since the state is and remains a provider of public goods and services. With the private sector being in control of mining, as is the case in South Africa, there is a risk that by the time of undertaking remedial measures to clean the environment, the mining activity could have stopped and the private actors could have closed business. It will be almost impossible to hold the private mining firms accountable for the environmental degradation that emanated from their mining activities.

4. Contemporary challenges of the South African mining sector in the Context of AMD problem

Despite its contribution to the national economy and its role in shaping the country's development path over time, the South Africa' mining sector still faces a number of challenges some of which may be exacerbated by the AMD problem.

Level and quality of sector employment

Organised labour and government still share the sentiment that the level and quality of employment in the sector can be improved upon. Through the adoption of technology which does not replace people but rather supplement individual productivity, the sector can grow further. Sector growth accompanied by increase in labour productivity, will enable the sector to employ more people and pay them better.

Thus far, many people employed in the sector are low-skilled workers that receive very low wages. Very few people are employed in technical positions within high wage brackets. Employment figures reflecting the number of people employed in the sector masks the fact that many hardly receive a living wage.

Wage disparity between senior managers and lower employment categories within the sector, remain the highest in the country. For example, whereas the starting average basic wages of an underground miner was less than R5,000 per month in 2014, one mining Executive was earning R2 million per month with an addition R2 million per month from shares. The income of the Executive was equivalent to total monthly take home salary of 800 lower level employees of the same company [20].

The combination of low pay for most of the people employed in the sector, the wage gap between high and low level employees, and the less than optimal working environment, promotes the sentiments that more can be done to increase the level and quality employment in the mining sector.

The potential effect of the AMD to efforts aimed at increasing the level and quality of employment is two-fold. If the mining houses are aggressively forced to account for AMD emanating from their activities and to adequately mitigate the effects of the AMDs, this will increase their production costs in the short term. Motivated by the desire to maintain high profits, they are likely to devote to cost cutting measures, which normally include retrenchments. So in terms of employment levels, the pursuit of internalising AMD in production decisions is likely to result in job losses or just maintaining same levels of employment.

The aggressive pursuit of mitigating the effect of AMD to the environment through the budget provision requirement on part of the mining houses, may also weaken the position of labour in pushing for higher wages. The mining houses will have another reason to justify why they cannot increase wages. They are likely to claim that their production costs have increased as a result of measures to control AMD, which has subsequently reduced their profit margins. With declared low profits, labour will find it harder to justify wage increases.

On positive side, the explicit taking into account of AMD is likely to create a safer working environment for workers. It is unlikely that a mining house will take measures to mitigate the AMD problem in isolation of other negative production externalities and safety issues. The recognition of the AMD aspect and the undertaking of steps to minimise its effects to the environment during and after mining can contribute the overall safety and quality of work environment for miners.

Low local beneficiation

Low or complete lack of mineral beneficiation has been identified as the main reason why the impact of mining activities has not permeated to other sectors of the economy. The disjoint between the mining sector and other sectors of the economy has limited the extent to which the country's mineral wealth has benefited South Africans. In addition, it has limited the revenue to the local economy due to exporting unprocessed minerals.

With mineral beneficiation taking place in the local economy, it is expected that more people outside the mainstream mining business will get jobs and become indirect beneficiaries of mining activities. External revenue from exports of processed or semi-processed mineral will also increase as a result of value addition that takes place in the local economy. Part of this revenue can be channelled to government's social welfare program, making it possible for more vulnerable people in the country to benefit from the country's resources.

Successful beneficiation has a high likelihood of increasing AMD problem and negative production externalities due to additional mineral processing taking place in the local economy. It is important therefore, that the planning for mineral beneficiation should include an assessment of the AMD effects that will result from the undertaking and put in place remedial measures to minimise its occurrence.

Drive to increase labour productivity

There has been renewed calls by mining houses to increase labour productivity. Mining houses argue that this will improve sector competitiveness and create possibilities of higher wages.

The mining houses and labour agree that improved productivity is important and potentially beneficial to each party. Productivity increases output per each unit of factor input employed, reducing average production cost and thereby providing a competitive edge to the producer in the market. The ability to compete in markets enables firms to sustain business and reduces the likelihood of job losses.

There are no guarantees, on the part of labour, that it will always benefit from increased productivity. Its benefit is conditional, based on the willingness of the employer to rightfully quantify the realised increase in productivity and the willingness to pass on a portion due to labour to the workers.

There are, however, practical complications in apportioning the value of productivity gains. First, there needs to be a generally acceptable definition of productivity and detailed data on production

processes. The production data should be accessible and understandable by all concerned parties. Most important, the data should be devoid of mistakes.

South Africa's experience in the mining sector reveals that the process of determining productivity and productivity related matters has not been transparent. The process lies in the hands of mining houses, as the custodian of production information. They decide at their own discretion what information to put in public domain or share with other stakeholders. The information asymmetry in favour of the mining houses makes it impossible for other stakeholders, especially labour, to rightfully claim a fair share of its contribution to productivity gains. Hence the reluctance of organised labour to participate actively in productivity improving initiatives as proposed by the employers.

The introduction of the AMD aspect in productivity improvement initiatives exacerbates information asymmetry between mining houses on one hand, and organised labour and government on the other regarding contributions to productivity gains. Labour and government are put in a weaker position in terms of agitating for better sharing of productivity gains. Business can use the AMD concerns and costs of AMD mitigation to discount productivity gain benefits that would have otherwise accrued to labour.

Ultimately, concerns on the AMD are more likely to serve interests of mining houses rather than those of labour in the short term. Unless labour is empowered to technically quantify its contribution to productivity gains and the mining houses are compelled to disclose all their production information in entirety, labour will not have a factual basis to claim its contribution to increased productivity.

Black Economic Empowerment

Black Economic Empowerment (BEE) for the mining sector is based on the Broad Based Socio-Economic Empowerment Charter for the South African mining industry that was promulgated in 2004. The establishment of the Charter is a requirement of the Minerals and Petroleum Resources Development Act (MPRDA) of 2002. Better known as the Mining charter it was aimed at empowering the previously disadvantaged South Africans take share in the ownership of the country's minerals wealth.

One of the challenges experienced in implementing BEE in the sector has been the sourcing of capital to buy shares by previously disadvantaged black people.

Some of the black entrepreneurs who ventured into mining BEE deals had to borrow money at unfair terms from banks in order to buy shares. Some of the shares bought could not yield enough dividend to service the interest on the borrowed money. These entrepreneurs became bankrupt or had to sell their shares at a loss but still had to meet their loan obligation using alternative source income. So, one of the risk of participating in the BEE and an encumbrances has been financing of BEE deals.

The AMD creates yet another risk for entrepreneurs wishing to take advantage BEE in the mining sector. With regulation in place that hold a mining house accountable for its adverse effects to the environment over its mining activity life time and post-mining period, a BEE partner can end up being liable to AMD mitigation costs for the previous mine owners.

It must be emphasised that the impact of AMD and other negative externalities of mining on the viability of BEE business in the mining sector is still a new subject that requires further investigation.

Conforming with sector policies regulations

South Africa has in place a number of policies and legislation aimed at ensuring that mining business is carried in an ethical way and that it promotes national development imperatives. Regulation pertaining to protecting the environment from adverse effects of mining existed even prior to the country's democratic transition of 1994.

The Minerals Act of 1991 (Act 50 of 1991) was specifically aimed at safeguarding communities around the mining areas from long term effects of environmental pollution emanating from the mines. The Minerals and Petroleum Resources Development Act (MPRDA) of 2002 went a step further to mandate for the internalisation of the social and environmental cost of mining. The MPRDA, further stipulated that funds should be allocated for future mitigating of anticipated adverse effects to the environment as a result of starting the process of mineral extraction before the mining starts [Ref].

Neither the Mineral Act of 1991 nor the MPRDA mentioned explicitly the problem of AMD. The problem was blanketed within other environmental pollutions. This lack of acknowledgment of AMD in legislation creates space for concerns and solution specific to AMD to receive little attention in the mitigation plans of mining houses.

The failure to mention AMD in the legislations creates opportunity for the mining houses to consider and focus on other types of pollution that are likely to cost them less in mitigation when they submit their operation plans to government. The impact of AMD to mining communities, when acknowledged, is more likely to be underestimated by the mining houses due to high costs of its mitigation during and post-mining period.

In all, the renewed interest and explicit recognition of the need to internalise AMD mitigation cost into the cost function of mining houses is likely to motivate policy makers to include AMD mitigation specifics in the legislations.

Labour unrest

The mining sector in South Africa has been characterised by labour unrest in recent years. In 2014, one of the longest and costly strike in terms human life took place in the North West province platinum belt. It lasted for 5 months costing the mining houses approximately R20 billion in lost revenue and loss of income to workers estimated at R2 billion [21].

The experience of the 2014 platinum belt strike showed that if a strikes drags on, it becomes a 'lose-lose' situation for all parties involved. As such, creating stability for the sector is one of the priorities for government and to some extent mining houses and organised labour.

The effect of internalising AMD on part of mining business can fuel labour unrest in short term. Since it tends to provide another reason for employers to continue paying lower wages siting increased cost of doing business. At the extreme, it can make some mining business unviable forcing them to close business or drastically reduce employees. The result will be more labour unrest contrary to the current intentions to stabilise the sector.

It is important therefore that the enforcement of AMD mitigating measures within the sector should be carefully planned and executed to minimise potential negative effect on sector employment. Otherwise such measures may trigger labour unrest.

5. Conclusion and recommendation

The mining sector has been an important contributor to the South African economy through its revenue generation for the country and employment creation. In assessing the extent to which the sector has contributed and should contribute to the local economy, mining houses, government and labour have tended to focus on current performance parameters. Stakeholders have been more concerned about production levels, profitability, external revenue generated, and number of people employed in the sector.

The assessment of the contribution has, to a large, extent, not taken into consideration effects of mining to the environment; one of which being the generation of AMD. Yet this effect is important in the sustenance of mining activities in a way that is beneficial to wider society.

For a realistic assessment of the contribution of the mining sector to the South African economy in short and the long term, adverse effects of mining activities such the AMD have to be acknowledged and quantified. The current contribution should be discounted with future mitigation costs of rehabilitating the environment.

The discounting of the mining sector contribution to the economy with mitigation costs of rehabilitating the environment should be captured explicitly within relevant policies and legislations. Otherwise, the sector contribution to sustainable development of the South Africa will continue to be overestimated in short term.

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