Resources Policy xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Resources Policy

journal homepage: www.elsevier.com/locate/resourpol

Sustainability in the mining industry: An evaluation of the National Planning Commission's diagnostic overview

T. Zvarivadza

School of Mining Engineering, University of the Witwatersrand, Private Bag 3, WITS 2050, Johannesburg, South Africa

ARTICLE INFO

Keywords:
Sustainable development
Mining industry
Environment
National Planning Commission
Legal framework

ABSTRACT

Environmental stewardship is the keystone to sustainability in mining and industry. While environmental compliance appears to be costly at first sight, it gives a mining company a competitive edge. Several pieces of legislation have been enacted as a means to deal with impacts of mining on the environment and hence provide an enabling environment for sustainable development (SD). The industry has adopted the principles of environmentally responsible mining, in line with the recommendations of international bodies like the International Organization for Standards (ISO), The Equator Principles Association and International Finance Corporation (IFC).

This paper evaluates the sustainability of the South African mining industry in the light of the National Planning Commission (NPC)'s overview that 'South Africa's growth path is highly resource-intensive and hence unsustainable.' Arguments are presented to refute this viewpoint and additional impacts of mining on the environment, not mentioned by the NPC, are also discussed together with the measures that the mining industry has taken to resolve such impacts.

Although the mining industry has instituted emergency preparedness measures, environmental incidents do occur, but these isolated incidents do not provide evidence that mining is unsustainable. Such events are a feature of all sectors of the economy. The author advocates the establishment of a SD legal framework through consultative discussions with interested and affected parties to create an environment conducive for legal compliance, which would include SD indicators to enable the Department of Minerals and Resources to monitor company compliance and identify defaulting companies.

1. Introduction

A sustainable mining venture takes cognisance of its impacts on the environment and adopts appropriate measures to address such impacts. This paper is a response to the National Planning Commission (NPC)'s argument that'South Africa's growth path is highly resource-intensive and hence unsustainable' (National Planning Commission, 2017). The response is from a mining perspective and is informed by a thorough study of mining operations in South Africa. The NPC falls under the South African department of Planning, Monitoring and Evaluation. It was developed in May 2010 with a mandate to establish a long term vision and strategic plan for South Africa and advise the government accordingly (National Planning Commission, 2017).

Some issues concerning mining and the environment were examined by the author and several experts consulted on the subject of sustainability. It is the author's opinion that, contrary to the NPC's arguments, the mining industry in South Africa is sustainable. The arguments posed by the NPC are discussed, and counter-arguments presented. The NPC's and public misconceptions are clarified by examining the impacts of mining on the environment and how they are resolved by the industry to ensure sustainable development (SD). While all necessary measures are in place to ensure incidents are prevented, isolated events occur in the mining industry like in any other sectors of the economy. However, to conclude from these incidents that mining is unsustainable is unwarranted. It is almost impossible to imagine any possible impact on the environment by the mining industry for which there are no mitigation measures. Given the mining industry's massive contribution to the economy and livelihood of people as well as the linkages and clusters forming around the mining value chain, a sustainable future beyond the closure of mines is possible as mining has made an immense contribution towards the diversification of a country's economy. The initial success of all the other sectors of the economy depends in one way or another on the inputs from mining, while in the same vein the mining industry serves as a market for most of the sectors of the economy. The proceeds from mining help establish sustainable sectors of the economy which later stand independently from mining if

E-mail address: Tawanda.Zvarivadza@wits.ac.za.

https://doi.org/10.1016/j.resourpol.2018.01.008
Received 31 July 2017; Received in revised form 27 November 2017; Accepted 19 January 2018

the principles of SD are incorporated efficiently.

The mining industry has gone beyond legal compliance as a sign of its dedication towards protecting the environment. Several organizations such as the International Council on Mining and Metals (ICMM), Global Reporting Initiative (GRI), International Standards Organization (ISO) and The Equator Principles Association among many others have emerged in the mining industry to extend maximum benefits and the competitive edge to all companies that embrace SD goals in their operations. This has led even formerly environmentally incautious corporations to follow suit lest they are disadvantaged through being noncompliant.

2. Meaning of SD

The term sustainable development can be split into two words to unpack its meaning. 'Sustainable' means that which can be maintained perpetually, while 'development' means enlargement. Sustainable development is thus the ability to maintain and enlarge all social, environmental and economic systems of any establishment in a way such that each generation manages to satisfy its own needs and does not threaten the ability of future coming generations to provide for themselves. Alternatively, Alban and Cardenas (2007) define SD as 'pursuing environmental protection and implementing social standards, while assuring economic feasibility in industrial activities.' Whereas, Bruntland (1987) considers SD to be'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. It is crucial to adopt a holistic approach in dealing with all issues pertaining to SD in order for it to flourish. Flint (2007) described the spectrum of SD issues as incorporating risk, ethics and governance, legislative requirements, natural capital/the green environment, social capital/society, human capital or people, economic capital, human-made capital, indirect and induced consequences, unintended consequences and cumulative consequences.

SD is a system that survives on the intersection of the social, economic and environmental spheres. Any fault in one of them causes dysfunction. SD can be explained using the relationship between the three spheres as expressed by the Southern African Development Community Regional Environmental Education Programme (SADC REEP, 2005) as depicted in Fig. 1.

The three spheres of SD have to be overseen by an efficient system of governance. SD is achieved only where the three spheres intersect, as shown by the arrow in Fig. 1. Looking critically at this concept, it can be deduced that SD constitutes equitable social benefit, limitation or reduction of environmental impacts and enhancing economic equity in all decision-making, which are the goals of all advocates for SD. SD addresses what needs to be sustained and what needs to be developed as outlined in Table 1. Adoption of the issues helps a company satisfy its SD obligations.

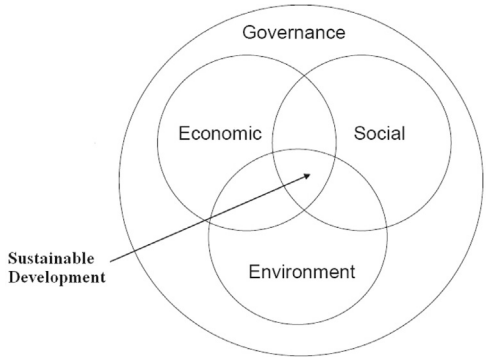

Fig. 1. Interdependence of the three spheres of SD (SADC REEP, 2005).

Table 1
What needs to be sustained versus what needs to be developed (US National Research Council, 1999).

What is to be sustained	For how long	What is to be developed?
Nature		**People**
• Earth	• 25 years	• Child survival
• Bio-diversity	• "Now and in the future"	• Life expectancy
• Eco-systems	• Forever	• Education
		• Equity
		• Equal Opportunity
Life support	**Linked by**	**Economy**
• Eco-systems	• Only	• Wealth
• Resources	• Mostly	• Productive sectors
• Environment	• But	• Sustainable Consumption
	• And	
Community	• Or	**Society**
• Cultures		• Institutions
• Groups		• Social Capital
• Places		• States
		• Regions

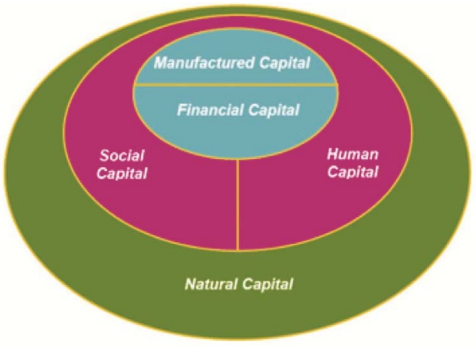

Fig. 2. Five capitals elements model (Forum for the Future, 2017).

2.1. Attributes of SD

The characteristics of SD are explained by the Forum for the Future (2017) using the five capitals elements model shown in Fig. 2.

This is based on the reality that mineral resources are not renewable in human terms considering the millions, if not billions of years, in geological terms, needed to replenish them. The theory suggests that the exploitation of natural resources like minerals should result in investment and development in other forms of capital (social, human, financial and manufactured) to ensure the sustainable establishment of other sources of capital after the exhaustion of natural resources. Sarkar et al. (2010) aptly explains that the concept of sustainability within the mining sector applies not to the practices of extraction, but rather to the conversion of the natural capital of mineral wealth into human, economic and social capital through, for example, more sustainable livelihood opportunities and community relationships. This leads to the diversification of the economy, extending different sources of livelihood to both present and future generations.

3. The NPC's viewpoint and counter-arguments

The NPC puts forward several arguments in support of their view that South Africa's development path is unsustainable. The following discussion focuses on the Commission's reasoning and attempts to illustrate why it is not valid.

3.1. Dependence on natural resources has perpetuated social fragmentation and exclusion, including unemployment and low educational and skills levels as under apartheid

With South Africa's transition to democracy in 1994, legislation was