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UNIVERSITY OF THE WITWATERSRAND



RE-VISITING THE LINK BETWEEN SUSTAINABLE DEVELOPMENT AND OPTIMAL MINING: DEVELOPING A STRATEGY FOR GROWTH AND DEVELOPMENT OF RESOURCE-RICH AFRICAN COUNTRIES

Akua Asamoah Debrah

A Thesis submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Doctor of Philosophy

Johannesburg, 2018

Declaration

I declare that this Thesis is my own work. I understand the University's stance on Plagiarism and declare that there has been no conscious attempt at plagiarism. However, all sources are used *bona fide* and the truth thereof cannot be guaranteed. This Thesis is being submitted for the Degree of Doctor of Philosophy to the University of the Witwatersrand, Johannesburg. I declare that it has not been submitted before for any degree or examination in any other University.

_____

Akua Asamoah Debrah

Signed at _____On the _____Day of _____20 18

Dedication

I dedicate this Thesis to God Almighty, and to my parents, Mr. Kwasi Debrah and Mrs. Faniel Debrah for their continued love and support throughout my life and especially during the writing-up phase of the Thesis.

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It's interesting how through countless exchanges with many minds led to the production of this document. I owe special thanks to several people and institutions for their immense contribution and support during the beginning, middle and final stages of the research.

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Abstract

For almost a decade, there was a commodity super-cycle (2002- 2011) that supplied many mineral-rich economies with rents for growth and development. However, on Africa's account, the impact of such rents on growth has been mixed, with the market economic system taking a fair share of the blame. Due to market inefficiencies and the decoupling of growth from the environment, the concept of sustainable development (SD) emerged as the cure for the ills of the market system. In this light, the fundamental question of enquiry in the thesis was to dissect the linkages between the SD concept and mining in Africa, i.e., to what extent is mining and SD linked in resource-rich African (RRA) countries, when mineral resources are non-renewable, physically unsustainable, and the concept of extraction opposes the idea of sustainability?

In dissecting the concept of SD, its definitions and applications to mining were interrogated, firstly teasing from literature the challenges of SD, and using a sustainability assessment framework methodology to devise indicators to measure SD at the national level, vis-à-vis the current interpretation. Four gold producing countries (Ghana, Democratic Republic of Congo, Tanzania and South Africa) were measured against the indicators to determine progress, and whether the 'Mining, Minerals and Sustainable Development' interpretation of SD for mining remains appropriate. The findings in the four countries showed that the balancing component's definition is challenging for true sustainability to be realised. In this bid, the conclusions to the national level assessment pointed to situating *optimal mining* within the broader view of SD and its inter-linkages. Thus, here, sustainable economic development (SED) was forged as a pivotal goal for optimising SD and mining in RRA economies.

Further assessment of what SED means resulted in the development of the 'Investment Framework for Resource-rich Africa's Development' (IFRAD) Strategy as a pathway

for Africa's growth. The IFRAD Strategy consists of a five-step process of: aligning development frameworks; understanding the resource potential of a country; types of mining investments; building critical mining sector linkages; and managing investment options for the future. These are fundamental for net equitable distribution of benefits and realising the goal of SED and growth of RRA economies.

The four countries (Ghana, Democratic Republic of Congo, Tanzania and South Africa) were further evaluated on the IFRAD process with specific lessons and recommendations to determine an implementation plan in realising the Strategy in each country. For mineral economies, a key lesson was re-calibrating mining policies with development and industrial policies, while ensuring that all key sectors are well-coordinated within an industrial policy framework. All in all, the contribution to knowledge is IFRAD's holistic approach, which ensures that the enabling environment for policy and requirements for mineral development are enhanced for sustainable economic development. The IFRAD process further provides a tool for the measurement of SED, and pathways for net equitable distribution of benefits from mineral wealth. This would be impactful for the management of rents by governments taking into consideration especially the compliance of the broader minerals industry in mining policy implementation.

List of Abbreviations

AfDB	African Development Bank
AIDI	African Infrastructure Development Index
AMDC	African Minerals Development Centre
AMV	Africa Mining Vision
ANC	African National Congress
ASGISA	Accelerated and Shared Growth Initiative for South Africa
ASM	Artisanal and Small-scale Mining
AU	African Union
AUC	African Union Commission
BBBSEE	Broad-Based Black Socio-Economic Empowerment
BITs	Bilateral Investment Treaties
CAP	Common African Position
CCSI	Columbia Center on Sustainable Investment
CFTA	Continental Free Trade Area
CI	Composite Indicator
CIF	Competitive Investment Framework
CIT	Corporate Income Tax
COMESA	Common Market for Eastern and Southern Africa
CPIA	Country Policy and Institutional Assessment
CSR	Corporate Social Responsibility
DMR	Department of Mineral Resources
DRC	Democratic Republic of Congo
DTTs	Double Tax Treaties
EAC	East African Community
EBIT	Earnings Before Interest and Tax
ECA	Economic Commission for Africa
EITI	Extractive Industries Transparency Initiative
EPI	Environmental Performance Index
E & Y	Ernest and Young
FDIs	Foreign Direct Investments
FI	Fraser Institute
FYDP	Five-Year Development Plans
GDP	Gross Domestic Product

GIP	Ghana Industrial Policy
GNI	Gross National Income
GoG	Government of Ghana
GPI	Global Peace Index
GPRSP	Growth and Poverty Reduction Strategy Papers
GRI	Global Reporting Initiative
GSGDA	Ghana Shared Growth and Development Agenda
GVA	Gross Value Added
HDI	Human Development Index
HIPC	Heavily Indebted Poor Country
HRD	Human Resource Development
HSDA	Historically-Disadvantaged South African
HSE	Health, Safety and Environment
ICMM	International Council on Mining and Metals
ICSID	International Centre for Settlement of Investment Disputes
IFC	International Finance Corporation
IFIs	International Financial Institutions
IFRAD	Investment Framework for Resource-rich Africa's Development
IIAG	Ibrahim Index on African Governance
IIAs	International Investment Agreements
IIDS	Integrated Industrial Development Strategy
IIED	International Institute for Environment and Development
IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
IP	Intellectual Property
IPAP	Industrial Policy Action Plan
IPAs	Investment Promotion Agencies
IPFSD	Investment Policy Framework for Sustainable Development
ISG	International Study Group
ISSP	Industrial Sector Support Programme
IUCN	International Union for Conservation of Nature
JPOI	Johannesburg Plan of Implementation
LC	Local Content
LI	Legislative Instrument
MDA	Mining Development Agreement

MDF	Minerals Development Fund
MDGs	Millennium Development Goals
M & E	Monitoring and Evaluation
MEM	Ministry of Energy and Mines
MMA	Minerals and Mining Act
MMDA	Model Mining Development Agreement
MMSD	Mining, Minerals and Sustainable Development
MNCs	Multi-National Companies
MPRDA	Minerals and Petroleum Resources Development Act
NDP	National Development Plan
NEMA	National Environmental Management Act
NGP	New Growth Path
NIPF	National Industrial Policy Framework
NPV	Net Present Value
NRGI	Natural Resource Governance Institute
NSDF	National Spatial Development Framework
NSSD	National Strategies for Sustainable Development
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PAIC	Pan-African Investment Code
PRSPs	Poverty Reduction Strategy Papers
PSONR	Permanent Sovereignty Over Natural Resources
PwC	PricewaterhouseCoopers
R & D	Research and Development
RC	Resource Curse
RCT	Resource Curse Thesis
RECs	Regional Economic Communities
RGI	Resource Governance Index
RRA	Resource-Rich African
RTD	Right to Development
RTM	Right to Mine
RSA	Republic of South Africa
SADC	Southern African Development Community
SAP	Structural Adjustment Programme
SD	Sustainable Development

SDGs	Sustainable Development Goals
SDI	Sustainable Development Index
SE	Sustainable Economics
SED	Sustainable Economic Development
SIDP	Sustainable Industrial Development Policy
SLTO	Social Licence to Operate
SSA	Sub-Saharan Africa
StatsSA	Statistics-South Africa
SWFs	Sovereign Wealth Funds
SWOT	Strengths, Weaknesses, Opportunities and Threats
TMAA	Tanzania Minerals Audit Agency
TDV	Tanzania Development Vision
TEITI	Tanzania Extractives Industry Transparency Initiative
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCHE	United Nations Conference on the Human Environment
UNCITRAL	United Nations Commission on International Trade Law
UNCSD	United Nations Commission on Sustainable Development
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNGA	United Nations General Assembly
UNSD	United Nations Statistics Division
USGS	United States Geological Survey
USSR	Union of Soviet Socialist Republics
WBCSD	World Business Council on Sustainable Development
WCED	World Commission on Environment and Development
WCS	World Conservation Strategy
WDI	World Development Indicators
WEF	World Economic Forum
WGC	World Gold Council
WGI	Worldwide Governance Indicators
WIR	World Investment Report
WMI	Witwatersrand Mining Institute
WSSD	World Summit on Sustainable Development
YCELP	Yale Center for Environmental Law and Policy

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Chapter 1

Mining and Sustainable Development in Mineral Economies: The Quest for a Growth 'Strategy' in Africa

1.1 Introduction

There is undeniable proof of mining's contribution to the economic and social development of countries. However, over the decades, it has been observed that economies which are abundant in natural resources have realised decreased growth and performed marginally on economic development metrics in comparison to countries that are resource poor (Auty, 2001; Sachs and Warner, 1995). The reasons to account for this low growth are both structural and dependent on the political economic dynamics of the resource-rich State in question (Auty, 2001).

In Africa specifically, the evidence to support the proof of mining's contribution to sustainable development (SD) remains mixed with the impacts of the so-called *'Resource Curse'* (RC)[1] dampening efforts at development. The prospects of mining's contribution seem dim in light of the RC. Thus, the Thesis takes a different view that an optimal conceptualisation of SD for Resource-rich African (RRA) countries can lead to a transformation of mining's contributions to economies in Africa and thereby gradually reduce the effects of the RC on mineral economies.

The Thesis comes at a watershed moment for proponents of SD. Its focus on SD arises from the fact that, as a discourse, SD has become the yardstick to assess all forms of

[1] In terms of the economic reasons for the RC, one of the arguments suggests that the rise in mineral exports leads to a real appreciation in the value of a country's exchange rates, which makes it easier for countries to import or spend on foreign commodities. This 'spending' effect results in a shift of labour and capital from the manufacturing sector to the mining and non-tradable sector; thus, weakening the countries terms of trade in manufactured goods and eventually economic growth in periods of downturn (Isham, 2005).

development at the project, national, regional and global levels; hence the move to define SD goals post-2015 development agenda. Furthermore, if the perceived and real impacts from mining have a major influence on SD's geographical manifestations; how should developing mining countries appropriate and implement the concept of SD in their jurisdictions?

In light of the above arguments, the purpose of the Thesis is to revisit the meaning of SD in mining; to deconstruct the concept and how best it fits into the framework of the market system. The contribution to knowledge and importance of this Thesis is the development of a '*Strategy'* for sustainable economic development of mineral economies that is measurable and provides for net equitable distribution of benefits so that all can be better off. This would be impactful for the management of rents by governments and taking into consideration especially the compliance of the broader minerals industry.

This introductory Chapter focuses on some of the seminal studies that account for economic growth and development, narrowly placing emphasis on the historical trends of policy application amongst RRA countries. More questions are raised rather than answered to guide the formulation of the research objectives and aims in the latter part of the Chapter.

1.2 Shortcomings of Neo-Liberalism, Economic Theories and Why Sustainable Development

The section provides an overview of economic theories and its associated challenges to better situate the arguments for SD. It considers the shift to neo-liberalism and why growth has not been exceptional under the current market system.

1.2.1 Economic Growth Theories and Development Policies in Africa

The starting point for this assessment is from the classical and neo-classical schools of thought.[2,3] Here, the view of 'economic growth' is precedent on the quantity of goods and services produced by a nation over time. It suggests that given a certain amount of labour, at a certain level of production, wages will be paid and the 'capital surplus' which remains will then accumulate to the capitalist. This type of capital is further re-invested in the production cycle to increase output over time. This, often termed 'capital factor accumulation'[4], has been argued by some to be a myopic view of production due to its non-recognition of *technology* as a key factor in the production function (see Todaro and Smith, 2011, for an account of growth theories).

Ghatak (1995) criticised the factor accumulation thesis because of its simplistic lens in viewing the nature of development in developing countries. His rationale was that it did not consider other complex factors such as culture, attitudes and traditions, which are the underlying social structures that influence developing economies in the short and long run (Ibid: p. 51).

To refine this view, later growth models drew emphasis on capital formation through savings, investment and trade, and labour productivity as pertinent for economic

[2]The literature survey does not consider the former arguments by the physiocrats and French schools of economic thought since largely what has become common place has been an extension and reformation of the classical approach as pioneered by Adam Smith (1776), David Ricardo (1817), Rev. Robert Malthus (1820) and John Stuart Mill (1849).

[3] In summary, Adam Smith's Thesis- 'wealth of nations' which sets the tone for the other classical economists like Ricardo, Mill and Malthus is about how economic growth can happen when nations focus their attention on manufacturing with little government intervention, or allowing the interplay of the invisible hand of the market to allocate the factors of production- land, labour and capital (See Smith, 1776). Although, some of Smith's arguments have been disregarded over time, some have been completely accurate. As can be witnessed from trends of world growth, economies that diversified away from primary commodities such as China, Thailand, India and 'the east Asian miracles' have witnessed exceptional growth. However, it is Smith's second observation, which is less debated that is most applicable to many developing countries. He contends that for subsistence economies such as in Africa, the applications 'of the import of manufacturing' remains short since the capacity to generate such outputs in raising innovation and ingenuity is severely limited. This argument is still critical for the 'economic development' debate in Sub-Saharan Africa.

[4] Capital factor accumulation in simple terms is the process of accumulating capital or stocking of wealth to enhance growth and productivity. In all economic models, it is believed that the more capital one accumulates the richer a nation becomes.

growth (see for instance Cobb-Douglas production function; Harrod and Domar model; Dual-sector theory by Lewis and Solow's growth theory)[5]. Because of these models, aid and loan financing to developing countries were justified. In support of this view, Solow (1956) purported that the biggest constraint to development was capital, hence the need to provide financing that would cause a 'big push' to stir productivity in developing economies (see also Acemoglu, 2009; Busch, 1968).[6]

The majority of economic planning and policies implemented post- 1960s were implemented based on the theoretical assumptions within the neo-classical school of thought. There have been several studies utilising empirical evidence and analyses, which pinpoint the challenge of neo-classical models to adequately tackle the imperfections of the market system and prescribe the real causes that shape growth in African countries (Clarke, 2012; Dollar and Kraay, 2002; Donaldson, 2005; Easterly, 2006). In the next section, the researcher assesses economic development policy choices by governments in RRA countries, starting from 1980-until now.

1.2.2 Reforms Post-1980s in Resource-rich African Countries

Prior to the neo-liberal reforms in the 1980s, there were falling growth rates and currencies, expanding public debt to Gross Domestic Product (GDP) ratio and declining economies under the nationalism era (Akabzaa, 2009). The World Bank's Strategy on mining in 1992 purported that for RRA countries to reverse the decline in their mining sectors, they had to follow the path of institutional and economic reforms to increase foreign direct investments (FDIs) as per the recommendations made by the

[5] See Cobb and Douglas (1928); Harrod (1939); Lewis (1980); Solow (1956).

[6] Although, the argument on aid may have been justified in Africa, it may also have contributed to the corruption and weakened accountability of many developing States and in some cases resulting in the RC (see Moyo, 2011).

Berg (1981) Report. Early reformers such as: Ghana, Uganda, Zambia and later Tanzania for example came aboard the process of economic recovery, commonly referred to as the Structural Adjustment Programme (SAP).

According to Kirkpatrick and Weiss (1995), the SAP was contoured on exchange rate devaluation combined with expenditure switching, tax reductions, and reduction of public expenditure in developing economies. Within a decade after the reforms, the majority of the reformers did not experience exponential growth as touted by the International Financial Institutions (IFIs) (UNCTAD, 2011; World Bank, 1992). Heidhues and Obare (2011) explore some of the lessons of SAPs and their effect on Africa. They conclude that in many countries, the SAPs implementation was devoid of good governance and the quality institutions which were needed to support the nature of the market system. As a result, although FDIs in the mining sector increased in some of the early reformer countries, it did not improve general output or gross national income (GNI) significantly in most of the countries referred to – nor anywhere else, until after 2000s (World Bank, 2013; Heidhues and Obare, 2011).

From 2002, there was a rise in GDP per capita and GNI of developing African countries, which have been attributed to the market system's reforms, i.e. the SAP, and the rise in global demand for metallic and non-metallic minerals from China and India (see Salinas *et al.,* 2011 on an extensive review of economic reforms in Africa; and the Economic Commission for Africa- African Union Commission- ECA-AU, 2011 report on mining and Africa's development)**.**

Figure 1.1 represents a stylisation of the facts of GDP per capita, gold and copper prices to illustrate the impact of mineral resources on GDP growth in three mineral economies- Ghana, Tanzania and Zambia. A timeline of the two main economic

systems is also included in the graph to highlight periods where growth was high in the three countries.

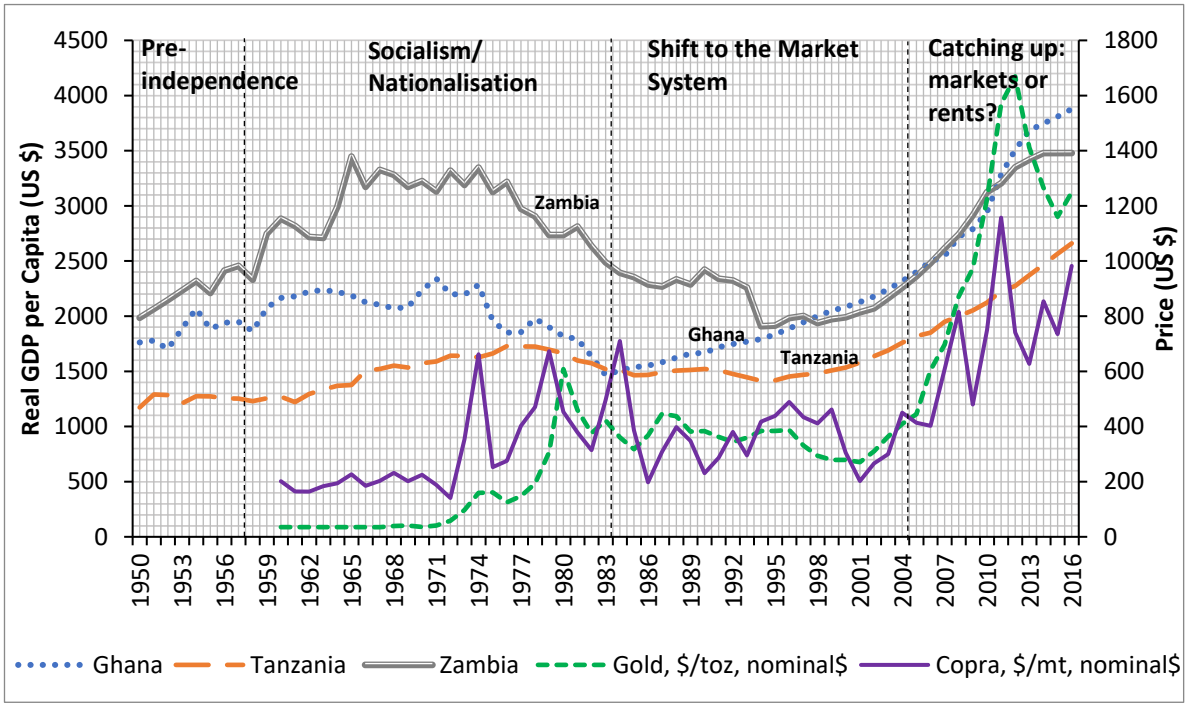


Figure 1.1: GDP, Gold and Copper Prices for Ghana, Tanzania and Zambia (1950-2015)

Source: Maddison Project Database (2018) and World Bank (2016), World Development Indicators (WDI) database

A critical assessment of some of the elements of growth post-2002 according to the ECA (2013) shows that the current increase in growth trends is also heavily influenced by mineral rents (Ibid, Economic Report of Africa, p. 20- 30). As such, Africa's growth trajectory although linked to market reforms is also highly inter-dependent on the rise in mineral prices. Refer to the trends of GDP, gold and copper prices from (2002- 2015) of Ghana, Tanzania and Zambia in *Figure 1.1*.

According to Bannon and Collier (2003) and Rosser (2009, 2006), mineral wealth should translate to increased growth and development because it enables the converting of mining revenues into other forms of capital and assets. In most parts of Africa however, mineral wealth has not had significant impact on development with

non-resource rich countries having a higher aggregate human development index (HDI) than resource-rich (non-oil) producing countries. *Figure 1.2* compares GNI and HDI of resource-rich (non-oil) producers with (non) resource-rich countries. The trends show a higher GNI for resource-rich countries, which may correlate with mineral rents than for non-resource rich countries in Sub-Saharan Africa (SSA). Moreover, aggregate HDI values for non-resource-rich countries are significantly higher than resource-rich (non-oil) producers.[7]

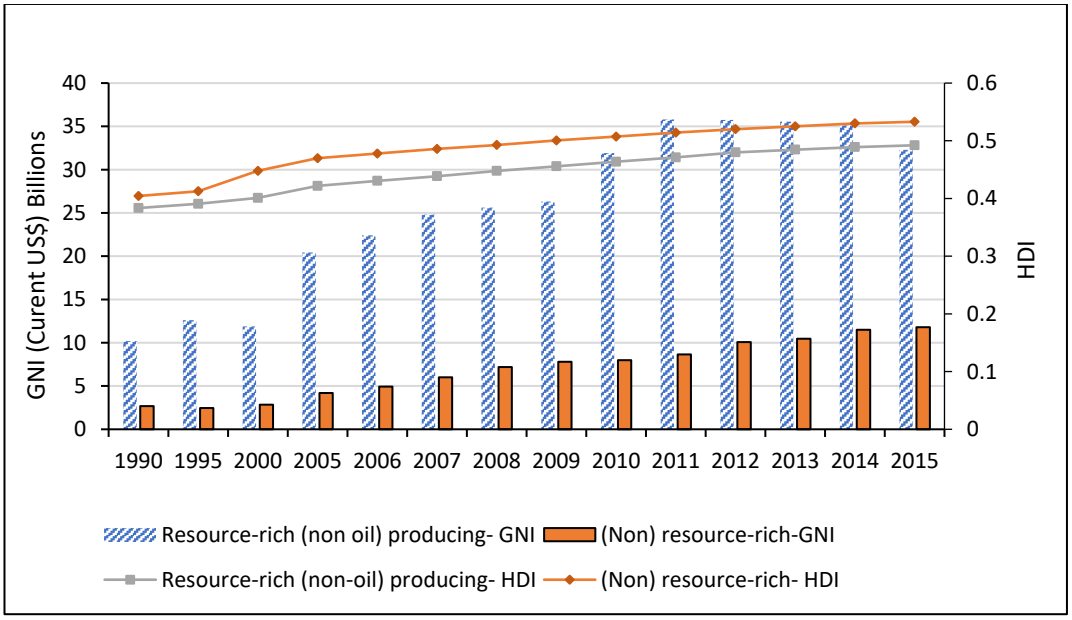


Figure 1.2: Compares GNI (current US$) and HDI of Resource-rich and (non) Resource-rich Countries in SSA (1990- 2015)

Sources: Word Bank (2016); UNDP (2016)

On balance, (non) resource-rich countries in Africa did grow but growth was not phenomenal; also, economic growth has not trickled down as much as the theory of the market suggests.[8] In summary, high volatility of mineral prices may lead to

[7] The resource classification was grouped into resource-rich (non-oil) producers and non-resource rich countries. The classification of countries is based on the International Monetary Fund (IMF) 2012 definition of a resource rich country. The country must be developing and must be either a low income or lower-middle income country with at least 20% of revenue from mineral resources or revenue of total fiscal revenue and exports (see Annex 1.1).

[8] The argument on whether growth is good for the poor or that growth trickles down to the average poor person is highly contested. What resonates from the economic literature (Tungodden *et al.,* 2004; Dollar and

significant output volatility and adversely impact overall macroeconomic performance, which in most cases as some have argued, undermines institutions and growth (van der Ploeg and Poelhekke, 2009).

Assertively, claims can be made that policies under neo-liberalism have not yielded significant growth in the African region despite the increased output of minerals and its positive correlation with growth (see *Figures 1.1* and *1.2)*. The move to pro-poor policies through the Poverty Reduction Strategy Papers (PRSPs) in the 2000s showed the weaknesses of the neo-liberal model (under the SAP), and also attested to the growing consensus that although, logically, mineral wealth increases GDP contributions, the kinds of policy mix and the motivation by leadership and governance are critical for growth (ECA-AU, 2011; UNCTAD, 2009).

Additionally, the type of extractive seeking institutions and the leverage of elitism (in the context of the political economy of the State) affect whether mineral wealth would benefit the citizenry and develop a country (Acemoglu and Robinson, 2002, 2012; Isham, 2005; Mendes *et al.*, 2014). Why have policies of past economic systems failed to yield significant growth in the African region? Moreover, since Africa is mineral-rich, can optimal mining be pioneered as a catalyst for transferring mineral wealth to growth and equitable development through a sustaining system and strategy?

1.2.3 Market Reforms and the Concept of Sustainable Development

Agreeably, market reforms have had some positive impact on certain economies with evolving forms of state capitalism in countries such as: Singapore, China, India, South Korea, etc. This has thus reinforced the favourability of the market system in

Kraay, 2002), and especially many World Bank reports is that growth generally is good for the poor; however, slow growth does not necessarily reduce poverty and in some cases worsens the fate of the poor. Since many countries in SSA have witnessed slow and declining growth; it is logical to conclude that growth has not trickled down as much.

maximising welfares, i.e. depending on the mix of various policies under the market approach (Dollar and Kraay, 2002). However, generally, it has been acknowledged that the system fails to allocate resources equitably, correct for market failures, and in many cases, extends social and economic inequalities (Chang, 2002; Ferguson, 1994; Stiglitz, 2013). It is imperative then to ask whether such a system can sustain the agenda to accumulate based on a largely unregulated global macroeconomic orthodoxy for sustained growth and a green revolution?

In the 1980s when the emphasis was on growth fuelled by neo-liberal orthodoxy, the over-exploitation of capital from natural (and specifically mineral) resources led to calls for stricter environmental governance, and later the concept of sustainability. The earlier works of Robert Heilbroner and Adolph Lowe in the 1970s showed the importance of the 'economic environmental nexus' in the analysis of the process of economics and its systems, coupled with the famous 'limits to growth' report by (Meadows *et al.*, 1972).

Meadows *et al.* (1972) affirmed the nexus and concluded using computer simulations of world population, industrialization, pollution, food production and resource depletion that the current economic system of exploitation is unsustainable "unless there were substantial rapid reductions in consumptive behaviour, in combination with technological progress" (Turner, 2008: p 38). Responses to curb the unsustainable ways of capitalist production, and the impact on the biosphere led to the development of the concept of SD to deal with the inefficiencies of the market system.

SD emerged as a solution to bring sanity to the limits and the inability of growth to transcend to tangible development outcomes. However, the popularity of the term did in no way guarantee a smoothening and general acceptance of its interpretation (Sanwal, 2003). The reason was initially because of its non-theoretical foundations,

and the moral injunction it placed on society, to transition it, into an applicable and robust concept with economic merit. Overtime, its acceptability moved beyond the definitional issues and its lack of theoretical core, to how the concept can be transitioned into tangible outcomes[9]. There are however well-founded criticisms for some of the interpretations of SD which are discussed extensively in relation to Africa in Chapters Three and Four of this thesis. Since the post 2000s have become intellectually accepting of the concept, the 'murmurs of disenchantment' as used by (Lele, 1991) has faded, with a shifting view of the need to integrate the systems of the economics, environment and social, and to effectively preserve inter and intra-generational equity in their share of natural resources.

1.3 The Development of Sustainable Development

The first global governance responses to the unsustainable concerns of the growth-centred approach of the market system included: the 1972 United Nation's Conference on Human Environment (UNCHE); the World Conservation Strategy (WCS) (International Union for Conservation of Nature- IUCN, 1980)[10] and the 1987 World Commission on Environment and Development (WCED). The WCED's key argument was that the pursuance of economic gains for development has led to the eroding of environmental resources to levels that the planet and its people could not bear for too long (see earlier arguments by Meadows *et al.*, 1972).

[9] See for instance, Pearce and Atkinson (1997); Beckerman (1994); Pearce (1994); and Lele (1991).

[10] The beginning pages of the IUCN (1980) report illustrates a diagram of three arrows within a thin circle (see IUCN, 1980; cover page). Annex 1.2 shows the diagram with the three arrows. The diagram on the cover page summed up the aims of the Strategy which were: maintenance of essential ecological processes and life-support systems; preservation of genetic diversity; and sustainable utilisation of species and ecosystems. It also suggested the effects of man's activities were disastrous on the thin circle of the bio-sphere (Ibid). Thus, man's activities had to be constrained, and come to terms with the reality of resource limitation and the earth's carrying capacity. However, although the Strategy built a compelling case for preservation and conservatism, it failed to address the pertinent question of how economic growth could be achieved within the earth's limited resources.

In the pursuit of development that is sustainable, the Commission postulated that a 'win-win' situation could be achieved for industries concerned with energy and raw materials, if the economics of their activities is integrated with the curtailment of its adverse environmental impacts (WCED, 1987). This balanced solution albeit from an environmental perspective gave birth to the concept of SD. The late 1990s and early 2000s witnessed a shift in the debate on 'sustainability' or SD[11] from the primary drive of environmental protection to ways in which economic growth can be integrated with environmental and social concerns (see WCED, 1987).

In adapting the concept of SD and its principles in mining, it has been noted that SD encompasses improvement in the well-being of human life and the protection of the environment (Rankin, 2011). However, this also does not mean entirely that the economics of the project must be compromised since it is the 'surplus' that would enable the sustainability of the other elements, i.e. environmental and social dimensions; nor is it to justify that mining should be irresponsible about the environment in which it takes place. The point is not for multi-national corporations (MNCs) or shareholders and owners of capital to profit but for there to be a fair balance of profit amongst stakeholders, and enough economic rents left to counteract the negative externalities from mining (Cawood, 2011; Di Boscio, 2010).

1.3.1 Mining and Sustainability

Since the concept of *sustainability* evolved from the camp of the ecologist, is mining 'sustainable' in a natural resource-constrained world where the act of mining opposes the core tenet of environmental sustainability, which is preservation? [12] Some schools

[11] The two terms are used interchangeably throughout the Thesis.
[12] See Rankin (2011) on SD and mining.

of thought have argued that 'sustainability and mining' depends largely on how one views the finite nature of mineral resources (Rankin, 2011; Tilton, 2003).

Tilton (2006; 2003) asserted that to answer the question of mining's sustainability, it is imperative to look at the nature of resource 'depletion'. Tilton (2003) provided two fundamental frameworks for assessment of the threat of mineral depletion in the context of the sustainability of mining, i.e. using the fixed stock or the opportunity cost paradigms.[13] Tilton and Lagos (2007) also argued that the fixed stock paradigm is not indicative of resource availability since it connotes the finite nature of resources and hence a deterrent to the concept of sustainability.

Gordon *et al.* (2007)[14] concluded that economic scarcity of minerals (under the proponents of the opportunity cost paradigm) presented a favourable alternative of mining's sustainability since technological innovations in the minerals industry has the propensity to increase reserves and stocks of minerals unlike using the fixed stock paradigm (also in Tilton 2003).

Cowell *et al.* (1999); Hilson and Murck (2000); and Howitt (1992) theorised that SD is possible if the industry makes changes to incorporate (or internalise) environmental and social concerns into mining's core business set-up.[15] Employing the case of Comalco Mining Company, Howitt (1992) purported that it was possible for the

[13] The fixed stock paradigm suggests the finite nature of ore bodies i.e. a given quantity is available in the earth's crust and hence can be physically exhausted. The opportunity cost paradigm proposes price and the opportunity cost of using the resource as a better determinant of depletion (or in terms of economic scarcity).
[14] Gordon *et al.* (2006) aligned themselves with the fixed stock paradigm and have contended that because of the finite nature of minerals, technologies should be geared to the recycling, re-use of minerals and substitutes.
[15] Hilson and Murck (2000) offer guidelines for mining companies interested in improving the sustainability of their operations. They recommended that Companies should improve planning and environmental management; use cleaner technologies; increase stakeholder participation; form partnerships and as well improve the training of mine personal in order to work towards improved SD goals.

mining company (in their assessment) to transition from the pure traditional economic approach to eco-efficiency and make economic gains.

Conversely, other commentators such as Crowson (2001) have strongly advocated that sustainability in mining before true profitability is deleterious for the mining industry. According to Crowson (2001), one must factor the different dimension effects of cost in relation to the global, regional, and the type of mine in determining economic rents, followed by sustainability considerations. Further analysis by Memary *et al.* (2012) on sustainability in mining to an extent supports some of the assertions by Crowson (2001). The authors analysed the copper and smelting industry in Australia in the past 70 years and concluded that despite tighter environmental regulations (towards carbon dioxide emissions), and declining ore grades, with improved and newer technologies, economic gains (or economic rents) had dissipated in some aspects of the value chain. Therefore, it can be said that improvements in one dimension of SD can erode the gains made in another dimension (Giurco and Cooper, 2012).

1.3.2 Sustainable Development in Industries

In sustainability, there are two positions of seeing ecological preservation- the position of strong sustainability and that of weak sustainability[16]. The distinguishing factor between the two positions is the 'substitution or substitutability of capital'. Strong sustainability is premised on the fact that natural capital or mineral resources must not be substituted but must remain intact since extraction would lead to eventual depletion. Whilst weak sustainability, which has a neoclassical economics approach considers natural resources as immutable and is transferred from one state to another, such as

[16]According to Pearce (1994), measuring SD depends on whether you belong to the camp of weak sustainability or strong sustainability. Weak sustainability asserts an indifference to the form in which natural capital is passed so far as it remains constant or is no less than what existed before; the latter asserts that critical natural capital should remain intact and must not be allowed to decline.

from ‘minerals’ which is a basic natural capital to for instance manufactured and financial capital.

Forum for the future, in viewing SD in this context, argued that the five capitals framework[17] “is the best way to manage these capital assets in the long-term, since it represents a dynamic process through which organisations can begin to achieve a balance between their environmental, social and economic activities” (Forum for the future, 2007: p.2). Furthermore, within each of the five capitals, there are 12 features of what a sustainable society should be and thus projects by various industries can be evaluated based on the features identified. It achieves this by firstly designing its own SD frameworks based on the identified 12 features, and secondly assesses whether they are sustainable or not. Hence, the model posits a ‘win win’ strategy for industries (Forum for the future, 2007).

The shortcoming of this model is that it assumes as *given* governance or leadership, which falls under ‘human capital’ to be benevolent in making appropriate investments in the various capitals. This is however subjective to the type of leadership or tied to the broader governance regime that exists. In a practical sense, an extrapolation of the model to the national level in mineral economies would be problematic since the element of good governance (and leadership) in mineral development is vital in achieving the objectives and goals of SD (IIED-MMSD, 2002; Collier; 2007, Cawood, 2009)[18]. Poignantly so, without the governance and effective regulatory frameworks

[17] This approach was contextualised into the ‘five capitals’ model from the works of Paul Ekins (1992) and Jonathan Porrit (1997; 2000). The model posits that all organisations use five types of capital to deliver their products or services. These include: natural capital, human capital, social capital, manufactured capital and financial capital. In the model, capital is transitioned from one form to another. Natural and human capitals are the two sources of wealth in which manufactured and financial capitals can be derived (Porrit, 2005). Thus, in this model capital is inherently never destroyed. The economic view of sustainability proposes that consumption of natural capital must always be lower than investments by society and economy into the other types of capital.

[18] Cawood (2009) contends that for countries such as South Africa which he used as a case study in his Thesis, to pursue a sustainable path for growth, optimal mineral development had to be implemented. However, it

to support the complex and conflicting concerns in mineral economies towards a sustainable path, optimal mineral development remains elusive for RRA countries.

On the global scale, there have been many international principles, initiatives and codes of ethics aimed at SD outcomes or goals of poverty reduction, environmental sustainability, sustainable consumption and production in both developed and developing country contexts. The application of some of the international standards and SD initiatives are usually administered from a top-down approach and may not be in sync with the interests of mineral economies or not specific to the nation or the developing region's context.[19] An example of this is how CSR frameworks are implemented by mining companies in Africa without recourse to local guidelines because in most instances, adequate frameworks that monitor implementation are usually non-existent. This often leads to haphazard and mis-aligned frameworks, which are driven by the different mining company's objectives and strategies (Di Boscio, 2010). Hence, there is a need to re-strategise mining initiatives and identify better indices that address the context and uniqueness of the mining industry, and where mines are located.

All things considered, it's widely acknowledged that the physical nature of mining makes it an unsustainable activity (Rankin, 2011; Whitmore, 2006). Rankin's (2011) book on 'Minerals, Metals and Sustainability' clearly affirms the fears of the industry which is that mining is unsustainable and the two words 'sustainable mining' are an oxymoron at best (see also Whitmore, 2006). However, this is largely dependent on

must be steered by the governance 'structures' that exist in country. He asserts that optimal mineral development should comprise of both optimal extraction techniques in mining to optimally maximise benefits, as well as the optimal use of the goods and services extracted for social and environmental equity.

[19] See Chamaret *et al.* (2007) on 'top down/ bottom up approach for developing sustainable development indicators for mining: application to the Arlit Uranium Mines (Niger)'. More so, the recent Rio+20 conference which was held in June 2012 acknowledged this aspect of SD and the need to devise indicators and targets that specific to the real needs of recipient nations (see United Nations, 2015c).

which view one ascribes to, i.e. whether the fixed cost or opportunity cost paradigm and the geographical perspective of the advocator.

To conclude, in many instances, the use of profit or economic rents from mining in the long-run can benefit both current and future generations, and enable the determination of whether mining is sustainable, as an economic activity (together with the discovery of alternate substitutes) or not. Because of the unique context of mineral economies in Africa, the priority of poverty reduction and growth requires a weak sustainability approach and a 'dimensions' view specific to the regional, local and national levels be used to direct the course of sustainability in mining. The strategic role therefore of governments in realising this becomes fundamental if mining is to be a sustainable activity. The Thesis expands on this in Chapter Three.

1.4 Research Problem

This section defines the policy problem and research questions that guide the Thesis in light of the discussions on economic theories, mining and SD. Despite natural resource abundance, many RRA countries have not closed the infrastructure gap and continue to have large development and growth needs. The fundamentals of the production function as laid out by Adam Smith and later modelled by Cobb and Douglas[20] are clear on how nations can grow, i.e. through the reinvestment of surplus value. However, there are also endogenous factors, such as innovation, human capital and investment in education and culture that must be factored, when steering the political economic discourse of RRA States (see Ghatak, 1995; Schumpeter, 1934). Therefore, it can be stated that the shortcomings of the market system and its reforms

[20] The Cobb-Douglas model explains the relationship between inputs, i.e., capital, labour and total factor productivity. It suggests that impact on the inputs in an economy affect the relevant yields or growth (see Cobb and Douglas, 1928). Although the model has been refined in later years, it remains one of the fundamental arguments to explain the production function in firms and at the macroeconomic level in economics.

may be absolved of having failed so long as RRA countries have not re-strategised and adapted the market system to their unique context (see discussions in Chapter Two).

Specifically, on mining, due to the interconnection between global and national mining environment, when countries do not have the wherewithal to implement resilient macroeconomic policies, such countries tend to lose out. The needed actions like effective governance, strong fiscal discipline and administration of fiscal policies are pre-conditions to ensure the long-term sustainability of mineral rents and to address the manifestation of the RC. As such, the Thesis recognises the research problem in RRA countries as originating from two strands, (1) insufficient understanding of mining and SD at the microeconomic level, and (2) the unique constraints or challenges of optimising a national level SD Strategy for mineral economies in Africa.

On the first point, the size of the profit at the microeconomic level is influenced by who has more to lose and what each stakeholder might receive at the end of the project's life-cycle. Also, governments are seldom astute about using a life-cycle approach to rent capture and in utilising their share of profit to create a self-sustaining mineral wealth for increasing growth and development.

In terms of the second strand, acknowledging the problem at the macroeconomic level involves managing resource wealth using key fiscal discipline and investment frameworks to foster growth. Since the mining industry has significant multiplier effects on the whole economy, building critical SD linkages with other sectors and with macro-fiscal instruments can lay the foundation for sustainability of mining in RRA countries (see Holland, 2014; Leeuw, 2012). In this regard, there would be firmer and more structured macroeconomic fiscal discipline which is important for mining leading to sustainable development.

Accordingly, RRA countries should consider the effective interaction between the economics and governance structures of their economies, which speak to both SD and not just mining, but achieving optimality in their mining processes. This has yet to be pursued in the mining and SD literature. However, before that can be realised, the fundamentals of the current neo-liberal agenda (market system) must be re-interpreted to developing RRA countries' contexts and their unique characteristics.

Generally, it can be stated that the current translation of SD in mining in Africa has been fraught with challenges (International Institute for Sustainable Development-IISD, 2011; ECA, 2012). However, at all costs growth and development must go 'hand in hand' if RRA countries are to make inroads into poverty reduction and development with the progressive use of mineral rents. Thus, intuitively, reinterpreting mining, which is optimal is fundamental to driving the goals of SD in mineral economies. 'Optimal' mining or optimal mineral development (used interchangeably) simply means ensuring the longevity and profitability of mining from exploration to closure and de-commissioning while concurrently investing mineral rents for optimal use and the sustainable economic development of extractive States.[21] This approach identifies that one of the core problems of (mining and sustainability) stems from a lack of understanding that firstly, rent generation and capture happen at the microeconomic level, hence there is need for effective management of the expectations of all stakeholders involved in the mineral production function, followed by rent management towards greater accountability.

Considering the above arguments, the research contends that the current interpretation of SD requires more thought in the African context to ensure profitability and long-term sustainability of mining. Thus, the key research questions intended to be

[21] Both 'optimal' mining and sustainable economic development concepts are explored extensively in Chapter Five of this Thesis.

answered are (1) *to what extent optimal mining and SD are linked in resource-rich African countries since mineral resources are non-renewable and physically unsustainable?* (2) *Can the current market system be refined towards a sustainable path for optimal mining in resource-rich developing countries?*

1.5 Aims and Objectives

The research's main objective is to interrogate the concept of SD and its applications within Africa's mining industry and economies. It aims towards the development of a 'Strategy' that is efficient and provides a better measure for SD and optimal mining in Africa.

The following specific objectives are expected to be achieved:

I. Assess how the concept of SD is being operationalised and what are the challenges in mining jurisdictions;

II. Within the ambit of the case study method of analyses, develop measurable SD indicators, which take cognisance of the geo-political manifestation of sustainability, and attempt to measure the balancing act of SD at the national level through an SD Index for mining in Africa;

III. Based on the manifestations of SD in sub-objective (II), analyse what is optimal mining in the context of SD and develop a national Strategy for sustainable economic development that would be essential for growth and distribution of net equitable benefits;

IV. Utilising the Strategy (as a framework), assess the applicability of the Strategy in gold mining economies in Africa.

1.6 Research Methodology and Data Collection Methods

In order to achieve the research objectives, the under-listed are pursued:

- A review of both primary and secondary literature taking into consideration data on SD, mining and the environment, and economic theory and economic systems that have dominated the political economy of resource-rich countries.
- A mixed methodology of qualitative and quantitative research techniques is employed to address the research problem. Here, interdisciplinary approaches are employed to help to reduce in-built biases such as spectrum, distinction and exclusion, which are common with the case study method of assessment.

The second part of the methodology focused on the development of the Composite Indicator or Index (CI). The method is based on ordinal rankings and aggregation around global and national indexes and national level assessment of SD and mining instruments in four selected countries. The methodology for the CI development and selection of countries are discussed in Chapter Four. The CI used the traditional conceptualisation of equal weights for the measurement of SD. There has been sparse research on aggregated measurements to interrogate how the concept of sustainability is interpreted. Although, some of the methodological assumptions may not necessarily be proven, it may provide some insights into the state of whether true sustainability (as currently interpreted by industry) is realisable for RRA economies and to what extent countries can follow an SD path.

The methodology behind the SD index is discussed with a java-based modelling software called IFCAD to generate SD triangles for the four countries. The IFCAD software is used to graph the scores on SD in the case study countries. Data gathered for the study are from numerous sources, including data from the World Bank, IMF, United Nations Conference on Trade and Development (UNCTAD), United Nations Development Programme (UNDP), African Development Bank (AfDB), United

Nations Economic Commission for Africa (ECA), African Union (AU), other international institutions, and national reports of the country case studies selected for the assessment. Majority of the sources have been itemized in Annexes 4.3- 4.5.

1.7 Research Design: Mapping the Conceptual Framework

The outline of the conceptual framework which guided the entire Thesis is illustrated from Chapters One to Nine in *Figures 1.3* and *1.4*. The descriptions and motivation which guided each Chapter follows in Section 1.8.

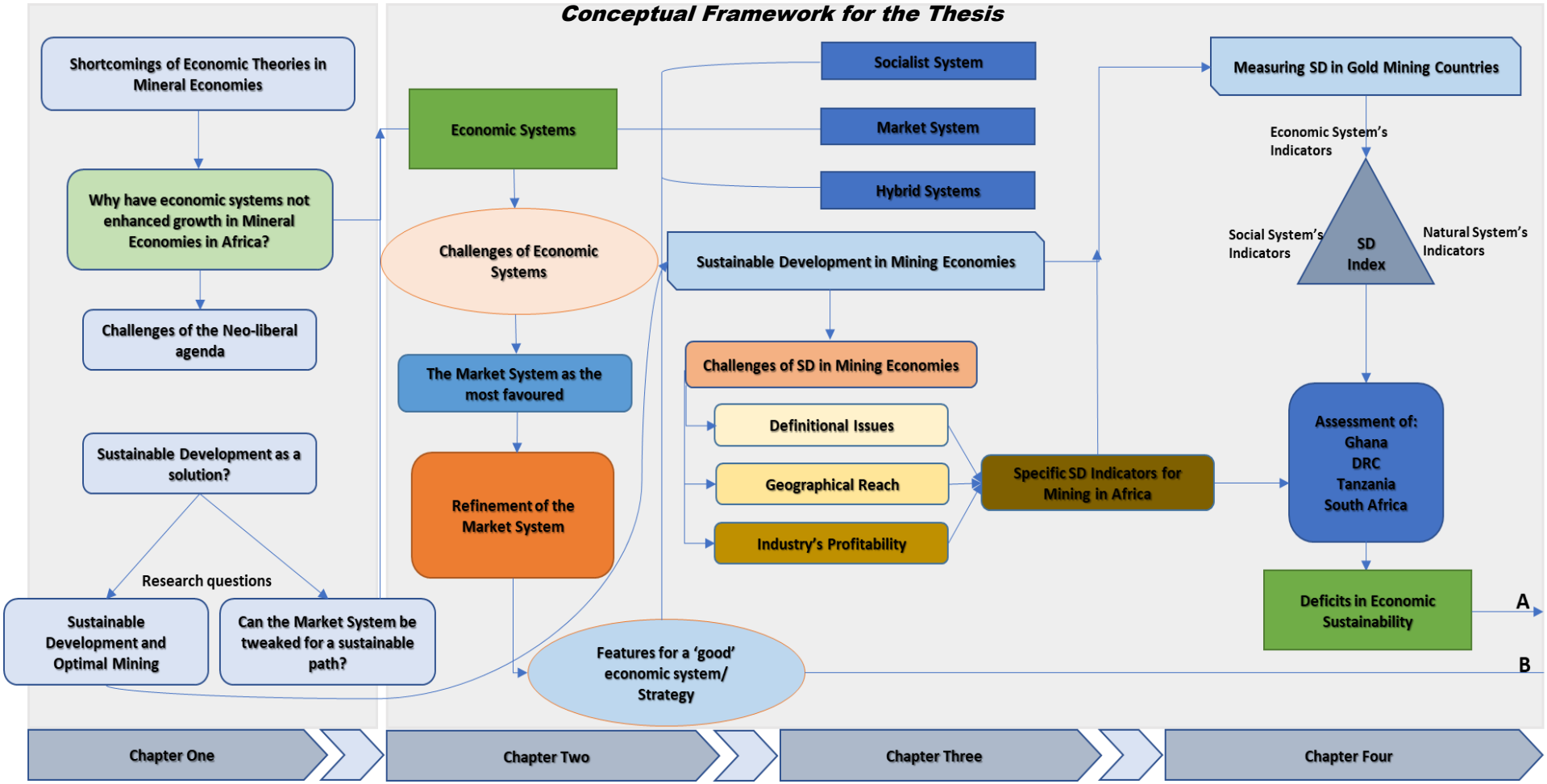


Figure 1.3: Outline of the Conceptual Framework and Research Design (Part A)

Source: Researcher's Conceptualisation (2016)

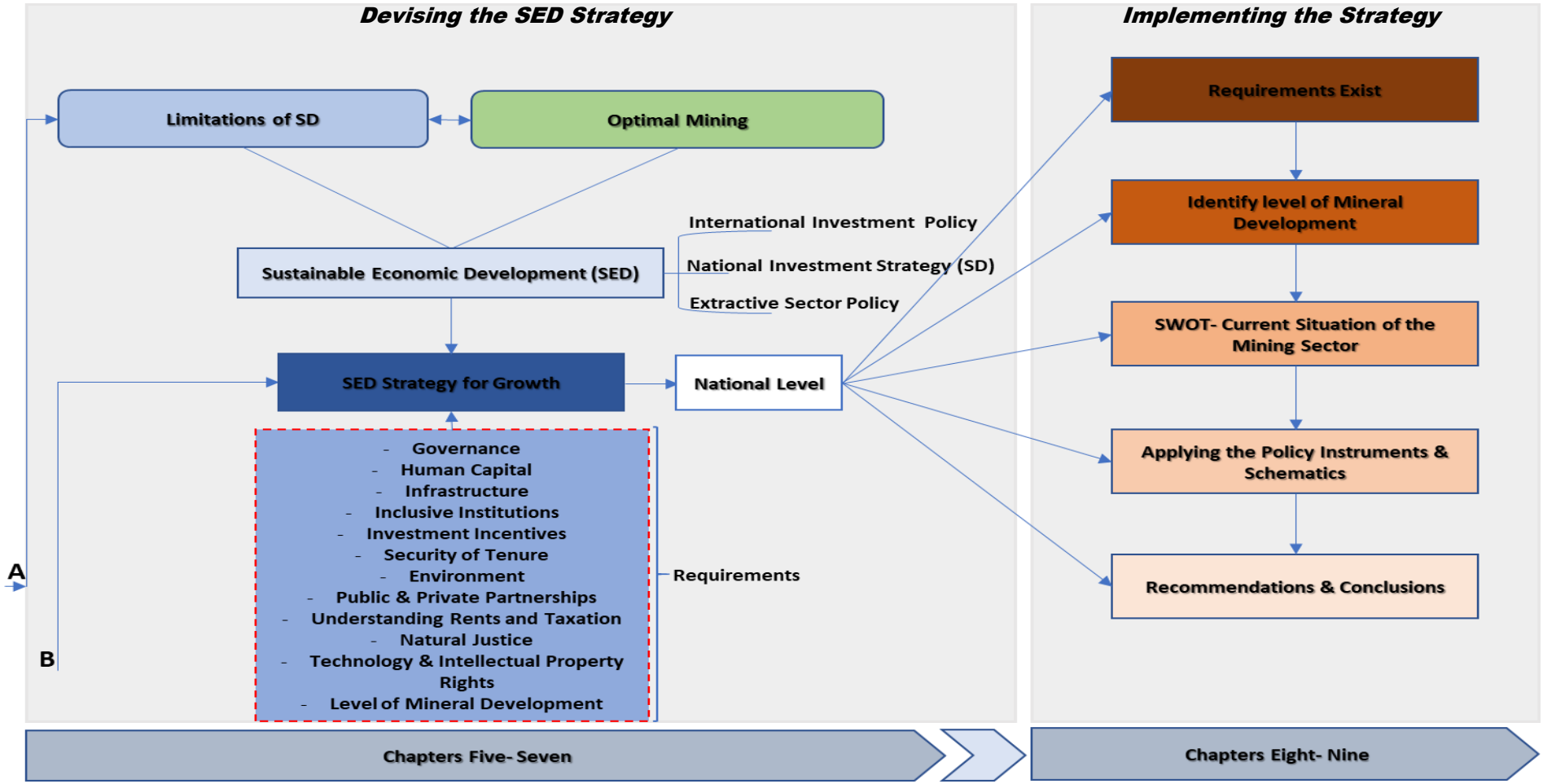


Figure 1.4: Outline of the Conceptual Framework and Research Design (Part B)

Source: Researcher's Conceptualisation (2016)

1.8 Structure of the Thesis

The Thesis is organised into nine chapters with a summary provided on each chapter below:

Chapter One: Mining and Sustainable Development in Mineral Economies: The Quest for a Growth 'Strategy' in Africa

This introductory Chapter assesses the general context of economics and SD in RRA countries. It identifies the overall problem of inadequate growth to meet Africa's development needs. It also provides the purpose, the scope, methodology, aims and objectives of the research, and the rationale for a revised view of SD for RRA countries. Its major thrust is for a 'Strategy' to ensure the growth and development of mineral-rich gold producing countries in Africa.

Chapter Two: Economic Systems and Elements for a Refined Strategy for Resource-Rich African Countries

This describes the three main economic systems- traditional, command-socialist and the market, and how the latter two have been influential in determining the choice of economic policies in RRA countries. It outlines key features that are still fundamental for the effective functioning of any self-sustaining system. These features are also crucial in defining a 'Strategy' for RRA countries.

Chapter Three: Sustainable Development and 'Issues' in Mining

This Chapter situates the current discourse of sustainable development in Africa and narrows the spectrum down to the context of its applicability to gold producing countries in Africa. To what extent have SD principles been imbibed in policy implementation and what have been the outcomes of SD in mining in Africa?

Chapter Four: Measuring Sustainable Development at the National Level

The four countries' (The Democratic Republic of Congo, Ghana, Tanzania and South Africa) SD approach to mining are discussed in light of an indicators' framework for measuring SD. The aim is to draw practical lessons on how SD has been implemented and the challenges faced by countries in achieving the balancing act within the SD systems. Its conclusions lead to the need for understanding how optimal mineral development is crucial for developing RRA countries.

Chapter Five: Optimal Mining and Sustainable Development- Establishing the Link for Growth and Development

This Chapter takes into account the deficit in economic sustainability in mining, introduces and rationalises Sustainable Economic Development (SED) by discussing the challenges of SD in Africa. The concept of optimal mining is also introduced and hinges on rent generation, capture and management. The fundamentals within the three aspects of optimal mining are explicated. The next step in the Chapter draws on the linkages between the concept of optimal mining and SD. It suggests that the '*bridge'* between the two concepts is SED vis-à-vis how to adequately garner and use mineral rents. It finally argues for the need for an SED Strategy hedged on investments at the national level for the growth of RRA countries.

Chapter Six: An Optimal Investment Strategy for Resource-Rich African Countries' Growth and Development

This Chapter develops the '*Investment Framework for Resource-rich Africa's Development'* (IFRAD) Strategy for the SED of RRA countries in light of current process considerations and requirements. The national Strategy is inter-dependent on relevant international investment principles and policy instruments aimed at supporting RRA economies' sovereignties and the *'right to development'* using mineral resources. The Chapter further narrows in on the 'first' part of the Strategy, which is the policy perspective and framework for Africa's growth and development.

Chapter Seven: Implementation Plan for the IFRAD Strategy in Mineral Economies in Africa

The Chapter presents the 'second' part of the Strategy, which is the requirements (or success factors) for transitioning the Strategy. A 'how to guide' (or plan) on implementing the IFRAD Strategy based on a country's level of mineral development is also presented. This is discussed together with policy objectives and instruments for realising SED within each process of the IFRAD Strategy. SED is crucial for RRA countries' growth; however, certain pre-conditions and success factors are fundamental for the effective implementation of the Strategy.

Chapter Eight: An Evaluation of the IFRAD Strategy in the Case Study Countries

In Chapter Eight, the framework devised in Chapter Six, and the requirements in Chapter Seven are used to evaluate the IFRAD Strategy in the four gold producing countries. It discusses in brief lessons and the schematics for applying IFRAD for emerging, semi-matured and matured gold mining economies in Africa. The implications from the assessments are discussed and specific recommendations in which the Strategy can be implemented by each country are highlighted. In concluding, some recommendations on improving the mineral investment environment in Africa at the national and regional levels are highlighted.

Chapter Nine: Conclusions and Recommendations

This gives a general summary of the Chapters. It discusses key conclusions and gives recommendations for further research to advance the view of SED for RRA countries' growth and development. The development of the IFRAD Strategy for SED as the first process means that future research in the area would have to consider a second level investment Strategy for the extractive sector at the microeconomic level for the mining industry. This will close the loop in the process of SED for mineral economies in Africa.

1.9 The Scope and Limitations of the Research

The scope of this research covers resource-rich African countries that are into the production of the 'strategic mineral' gold. The preference for choosing countries producing 'gold' over non-metallic and or oil producing countries is because of the influence that petro-dollars have on economic growth, which often creates a false impression of the stability of an economy.

Furthermore, gold plays a significant role in most economies and remains a significant contributor to foreign exchange earnings and as a store of value. Despite the recent decline in gold prices (post- 2008), gold has remained a vital component of the rural economic development of mineral economies, in addition to other minerals such as diamonds, manganese, platinum-group metals, bauxite, industrial and other rare minerals. Additionally, the selection of gold is based on its unpredictability of earnings/rents, which influence the development structure of RRA economies by making growth highly volatile. Thus, what are the challenges of SD in gold mining countries and how can the concept be appropriated to facilitate the holistic development of RRA countries?

In selecting gold producers in Africa for the assessment, the following criteria were employed:

- Resource richness in gold and levels of gold production;
- The Fraser Institute's (FI) mineral potential: best versus current practices;
- Performance on social, economic, environmental and governance indexes, consisting of the human development index (HDI), gross capital formation (for economic diversification), environmental performance index (EPI), and the worldwide governance indicators (WGI) respectively.

The highlighted criteria led to the selection of: Ghana, the Democratic Republic of Congo, Tanzania and South Africa for the case study analysis. For the purposes of this

Thesis, Tanzania and the United Republic of Tanzania are used interchangeably, since it refers to the same country. The selected countries represent distinct stages or levels of emerging, semi-matured to matured mineral economies in Africa. To cover the distinct levels of mineral development, only four countries were considered due to the extent of the analysis of the Strategy and its implementation in Chapter Eight. The justification and methodology for the selection of the countries are provided in Chapter Four; the classification based on the levels of mineral development, i.e. emerging, semi-matured and matured are discussed in Chapter Seven as part of the implementation process of the Strategy.

In terms of limitations, the Thesis recognises that the nature of this undertaking is very sensitive since it connotes the challenge of resource-rich African countries to capture mineral rents for long-term growth. A major limitation was proving that SD in the mining industry has been sub-optimal. This was because the data and literature to lay claim to some of the facts (in terms of its depth and breadth) were limited (scanty and unavailable). Furthermore, information sources with regards to assessing indicators for quantifying environmental damage and pollution in most RRA countries were not readily available in certain instances (with exceptions to South Africa and to an extent Ghana). Even for these countries, current data was limited and not readily available. As such, the Thesis relied on some global measures of relevance to the African context in assessing sustainability.

Another limitation is the generalisation of the findings since four countries were understudied for the assessment. Nonetheless, because the Strategy discussed in this Thesis considered the distinct levels of mineral development, future research can aim for replication by understanding the context, tweaking and identifying where in the process of the Strategy that countries fit, and tailor to their unique context.

1.10 Conclusion

The Chapter presented the background to this Thesis. It canvassed the research methodology and design, structure, scope and limitations of the Thesis. In terms of the review of the literature, it discussed some of the challenges of economic policy implementation in RRA States, and the recent SD discourse. The Chapter posited that effective interactions between 'economics' and 'governance' are critical to the growth of RRA economies. However, beyond the governance element, the current market economic system's lack of capacities has also hindered growth ends, coupled with implementation deficiencies in human capital and lack of innovation in RRA countries. It concluded with the realisation that SD as a discourse would have to be refined to the needs of RRA countries albeit from an optimal mining perspective. Because the Chapter pointed to the fallibilities of the market system, the next Chapter reviews current economic systems to identify whether the market system has merit for mineral economies, and what elements or features can be integrated with some of the goals of SD in the development of a 'Strategy' for RRA economies.

Chapter 2

Economic Systems and Elements for a Refined Strategy for Resource-Rich African Countries

"For my part I think capitalism, wisely managed, can probably be made more efficient for attaining economic ends than any alternative system yet in sight, but that in itself is in many ways extremely objectionable" (John Maynard Keynes, 1931: p.321).

2.1 Introduction

The rationale for this Chapter is to assess the merits and demerits of economic systems and which of the systems have merit for RRA countries' development. Some simple criteria for measuring sustainability or 'longevity' in this case is explored and used to make comparisons of economic systems and which is the most effective for Africa. Toward the concluding sections, the Chapter justifies why the shift to neo-liberalism under the market system has been lauded by policy-makers and suggests ways for improving the system for optimal mining and the growth of RRA countries.

2.2 Characteristics of a 'Good' Economic System

As a starting point, it is important to mention that SSA has been party to three main types of economic systems, i.e. the socialist or command, traditional, and capitalist or the market.[22] Of the three systems, studies have confirmed that the adoption of the neo-liberal agenda (under capitalism) from the 1980s until now continue to shape Africa's state of affairs (Austin, 2010; Heldring and Robinson, 2012; Settles, 1996). This is despite the fact that implementation has been complex with the convolution of mixed

[22] Heilbroner (n.d); Reynolds (2005); Schnitzer (1999) and others have identified varying types and hybrids such as between the market and socialism; and extreme forms of socialism and the market termed 'communism' and 'laissez faire' respectively. Also, there are several types of market economic systems with varying degrees of influence of socialism as practiced in some developed countries like the United States, Britain and Canada.

subsistence and traditional ways, imprints of colonial legacies and survivalist tendencies (Clarke, 2012). However, to get an overarching view of the nature of economic systems and influences, the Chapter considers the three systems and some of the hybrids, such as the Islamic economic system and the variations of the mixed socialist and capitalist economic systems.

According to Grossman (1974), an economic system is a *"functionally related set of institutions tasked to accomplish a set of goals or purpose which usually reflects the desired outcome or (output) of the collective whole in an economy based on an established set of principles"* (Ibid: p. 5). It is the combination of institutional forces in making decisions on the distribution and allocation of scarce resources in an economy. Implicit in the theory of economic systems, is the notion that the various components such as the [economic units, agents and institutions] interconnect and interact with a certain degree of consistency and coherency toward a desired outcome (Grossman, 1974: Chapter 1; Eckstein, 1971).

In Grossman's (1974) comparative analysis of economic systems, he contextualised the evolutionary, adaptability and sustainability essentials for a good system by suggesting ten performance criteria for defining the paramount or best system. From his assessment, the following criteria of: *plenty, growth, stability, security, efficiency, equity and justice, freedoms, protection of the environment, sovereignty and value systems* were pre-requisite for an effective system (Ibid, p. 3- 14). A sound balance between the criteria in any system can enhance its adaptability to a changing world context.

Since Africa's growth path has been linked to a paradigm shift in economic systems and an increase in mineral rents during the last two decades, the next section would comparatively analyse the three general economic systems of traditional, command-

socialist and the market as identified by Heilbroner (2011; 1999; 1994; n.d.) and Reynolds (2005) in the context of its institutional arrangements. Here, what is considered are the forms; principles; advantages and disadvantages and its sustainability in current economic dispensations.

2.3 Comparative Analysis of Selected Economic Systems

This section contains a qualitative analysis of the merits and demerits of the three general economic systems in the world. The sub-Saharan African region has implemented three types (socialism and capitalism) with the traditional system being inherent in the socio-cultural ways of being. In addition, the hybrid systems such as the Islamic Economic System and the mixed economic systems are discussed in light of what should constitute a good economic system for RRA countries.

2.3.1 The Traditional Economic System

The oldest system to further the progress of development has been the traditional system. As the name suggests, it typifies an economic system that is shaped or characterised by rules and ideologies, which is part or inherent in the norms of societies. The institutional arrangements set in this type of system are informal and through repeated use of certain solutions to the economic problem of 'resource allocation', it becomes adapted into the way of doing things overtime (Reynolds, 2005). Reynolds (2005) makes a succinct point which exemplifies the nature of this type of system. He asserts that:

> *"Traditional economies tend to depend upon a deontological ethic. Duties to other members of the family, tribe or clan and reciprocity are the primary allocative mechanisms. The forms of production that individuals engage in are based on the processes that have worked in the past. Social institutions such as religion may evolve to reinforce the traditional ways"* (Ibid: p. 68).

In this type of economic system as is being postulated by Reynolds (2005), the forms and principles are informed by the primary element of 'reciprocity' and 'duty'. Since the form and principles are based on the accepted notions, which are determined by the type of society, as such, there is no universal or predetermined structure to this system. Rather, reciprocity is the commonality in all traditional systems. Thus, Heilbroner (1999) has contended that as a result of obligation, a person is bound to follow in the suit of his predecessors' profession.

Observably, this type of system, although having been mixed with the command and market systems, is quite common to a certain degree in many parts of the developing world, especially in Africa and Asia (Reynolds, 2005). In Africa, traditional systems and cultural obligations are endemic which explain why the capitalist system may not have fully transitioned. This is in part due to the traditional and social institutions which shape the political economic dynamics of resource-rich States in Africa (see Clarke, 2012).

The major advantage of this system is the sense of community and belongingness which benefit all in the society. Its drive is propelled by a 'moral incentive' on the part of everyone to promote an attitude of goodwill towards one another. However, such a system becomes stifled when there is a need for expansion of society since it cannot adapt or respond quickly to dramatic changes in technology and the environment (Heilbroner, 1999). The sustainability of this system therefore becomes compromised when efficiency in terms of output is needed to allocate resources, over duty and reciprocity to serve the *'interest'* of growing populations.

2.3.2 The Market Economic System

The market system which grew out of the feudal system from the 12th to the 15th century in England and France has been one of the most influential systems of economics in

modern economic dispensations (Wallerstein, 1976: Chapter 1; Allis, 2008; Heilbroner, 1999).[23] This system is organised such that decision-making by individuals determines the allocation of the factors of production or resources. Putting the institutional arrangements in capitalism in context- they hinge on private property; profit motive or incentive; price mechanism; freedom of enterprise; competition; individualism; the protestant work ethic, and limited government intervention, i.e. depending on the type or the form of government control (Schnitzer, 1999).

According to Loucks and Hoot (1943), capitalism can be defined as *"a system of economic organisation, which is featured by private ownership and use of private profit of man-made and nature-made capital"* (Ibid; p.35). Two major principles under 'the market' can be traced: (1) self-interest propelled by the institution of competition and (2) surplus value, which is contingent on a re-investment of profit for the creation of more surplus value (Ibid). However, in interpreting the 'market system', it is difficult to draw a line between its economic institutions and principles since they work hand in hand to define the system (Heilbroner, 1999).

Merits of capitalism are that it is self-regulating and allows for the creation of surplus value and accumulation of wealth, hence, leading to a corresponding and general rise in living standards. It is through the accumulation of surplus value and the profit motive, which is reinvested in new forms of capital, new technologies and research and development (R & D) that allows the capitalist mode of production to be 'more' efficient than the two other systems- command-socialist and traditional (Loucks and Hoot, 1943; Grossman, 1974; Schnitzer, 1999).

Heilbroner (1999) observed that it is the lure of gain, and not the whip of authority, that steers the economy in the capitalist system. The instruments of the market system are

[23] See Loucks and Hoot (1943) and Wallerstein (1976) for a detailed account of the 'market system'.

its factors, such as land, labour and capital, which act as the 'agents' of production, with land being owned by landowners, who receive rent; labour being provided by workers, who receive wages; and capital being controlled by capitalists, who receive profits. Entrepreneurs are the agents of change and democracy permits such change (Ibid).

Conversely, one key disadvantage is that it fails to allocate resources equitably because most economic resources are privately owned, and a laissez-faire type of government extenuates social and economic inequalities. Other demerits arise from poor allocation of property rights, which tends to create a class structure and eventually class struggle as argued by Marx (1867). Karl Marx contended that inherently, capitalism which is self-regulating is unsustainable without government intervention and contains within itself the possibility to self-destruct (Ibid).

Heilbroner (1999), in discussing Ricardo's (1817) thoughts on political economy of the market, also observed that landlords forever receive unearned rents, workers work for a wage and are forever condemned to subsistence. Thence, the capitalists run the show for profits and forever run the risk of losing savings.

The industrial revolution and colonialism further exposed the weaknesses of the market system. Capitalism has undoubtedly negative impacts on individuals because the system does not address poverty problems. It is also a thriving platform for a class system and a negative impact on the biosphere and the environment; hence the clarion call for equity and environmental protection as a core developmental objective (Grossman, 1974; Heilbroner, 1970; Reynolds, 1971; WCED, 1987).

2.3.3 The Socialist Economic System

The meaning and distinction between what is socialism, communism and command have been contested in the literature[24]. The theory suggests that socialism emerged out of a combination of capitalism's economic failures and the oppressive nature of the class system. Many commentators questioned the equity of the market system and started to promote a more socialist approach, e.g. some thoughts on the matter included:

- Landlords are parasites - Ricardo (1700s);
- Expanding economic output by State planning, where the scientist and engineer had to play key roles - De Saint-Simon (1760 - 1825);
- For a good society, a minimum income must be guaranteed to all - Fourier (1772 - 1837); and
- Laissez-faire policies result in unemployment and misery for a large part of the population - Sismondi (1773 - 1842).

Mill's (1806 - 1873) insight at the time was remarkable. He predicted a phased transition from capitalism to socialism, namely:

- Stage 1 - Benign socialism, where mankind turns its energies to serious matters (justice and liberty as part of economic growth);
- Stage 2 - State would prevent landlords from reaping unearned benefits (by limiting ownership powers and taxes);
- Stage 3 - Worker associations will change the relations between enterprise organisations and workmen (by the formation and strengthening of unions and using numbers as a competitive advantage); and
- Stage 4 - Workers will 'win the day' causing capitalism to gradually disappear.

Applying some of Mill's (1849) assertions to Africa almost two centuries later, it is still startling because of its relevance. Two obvious questions arise from it, that is: (1) is this what is happening in current dispensations? and (2) are some parts of Africa in the early stages of Mills' Stages 3 and 4?

[24] See Kornai (1992), 'The Socialist System: The Political Economy of Communism'; Schnitzer (1999) for an extensive account of the command-socialist systems.

The early commentators set the scene for Karl Marx, who gave structure to socialist thinking. Marx (1867) expressed the following views:

- Capitalism and private property were evil;
- Socialism and State production were good;
- Mankind's goodness must prevail over greed;
- Capitalism is inherently unstable and would self-destruct;
- Capitalism is morally wrong as a social structure; and
- Capitalism will eventually be replaced by communism.

Marx died in 1883; however, his economic theories are still widely studied. He created an international working-class movement by not proposing a sustainable economic system, but by focusing on the weaknesses of capitalism with statements like capitalism has a "...vampire thirst for the living blood of labour..." and capitalism came into the world "...dripping from head to foot, from every pore, with blood and dirt..." Heilbroner (1999), quoting Marx.

Socialism principles rely on (utopian) optimism on the good of all mankind with no self-interest, resentment of the class system and a humanist approach to economics. This meant a cure to the social ills of capitalism (Heilbroner, 1999).

Merits of socialism include the ease to develop and implement new policies; possibility to alleviate unemployment and poverty problems; and perfect socialism allows for a just distribution of wealth. Demerits of socialism is that it is incompatible with the freedom of the individual and socialism can only work in a human-less model since economic freedom of non-interference is needed to achieve efficiency for economic growth. Socialism embraces the same governance challenges as capitalism, such as, it does not address associated poverty-related issues, but attempts to correct distribution of wealth. It is therefore unsustainable as was evidenced by the fall of communism in late 1900s, and the many failures in Africa between 1950s and 1990s. It is like a utopian

dream applied to economics. The next section considers the hybrid forms of socialism and capitalism, and traditional economic and religious belief systems. The point of these discussions is to glean elements of what should constitute a good system. This is achieved in the final sub-section 2.5.1.

2.3.4 Hybrid Systems

Rosser and Rosser (1998) discussed other forms of evolving economic systems tied to traditional religions with modern technology. Per the authors, traditional socio-cultural systems and religions such as Islam and neo-Confucius are evolving as emerging traditional economic systems (Ibid). However, due to the nature of economic systems in general and its relevance to Africa, the assessment considers Islamic economic system and the mixed socialist and capitalist systems.

Socialist-Market and Market-Socialist Economic Systems have gained ascendancy in most noticeably China and the Nordic States. Like most former socialist States, the mixed system of China (*socialist-market*) is run by the principles and blue print laid out in "Das Kapital" by Marx (1867). The arrangements of the system are similar to the United Soviet Socialist Republic (USSR), which is premised on authoritarian rule, coupled with terror to restrict economic freedoms, mobilise resources (through land seizures) and to devote large capital shares for capital formation. This is achieved through a highly centralised administrative structure which implemented 'five-year plans' dictated by the head of government. China has currently implemented nine of the five-year plans and in 1992 shifted to formally integrate the market economic system into its economic structure. In an article by China through a lens (n.d.), it was stated that the main aspects of the market reform were to build on the shortcomings of the socialist era by encouraging private ownership, economic diversification of businesses, the establishment of an open economy for unrestricted trade in goods and

services, and to promote the effective distribution and allocation of resources. On the other hand, the Nordic countries' (i.e. Norway, Sweden, Denmark, Finland, Iceland, etc.) form of social democracy within a capitalist State also show type of (*market-socialist*) system. Here the 'invisible hand' operates unhindered. However, in areas of healthcare, education and its labour force, the State intervenes by providing social incentives such as subsidies for free health care and education for some classes of citizens. Provision is also made for strong 'worker' rights to help lower-waged workers and the unemployed. Re-distribution of income of all sorts is achieved through high taxes on middle to upper income earners to pay for the social interventions.

Islamic Economic System reflects some aspects of capitalist and socialist systems but predicated on principles of the Islamic faith. This is common practice in Pakistan, United Arab Emirates and majority of the States in the Middle-East.

Per Chaudhry (1999), the Islamic economic system is premised on the following five pillars:

- Discrimination between Halal (permitted things being lawful) and Haram (forbidden things being unlawful);
- Equitable distribution of wealth through Zakat, Sadaqat and laws of inheritance (social justice);
- Provision of basic-necessities of life for every citizen (social security);
- Prohibition of hoarding of wealth and promotion of its circulation in productive channels; and
- Elimination of interest (Ibid, Chapter 18).

The basis of this economic system is on the abolition of interest (Reba or 'no interest') within its banking and financial system. If fully implemented based on the principles in the Qur'an, some of the advantages may include providing social justice, social security system, and ensuring that every citizen would obtain a fair share of the national wealth. To solve the problem of 'no' interest, the Sadaqat (voluntary giving of a portion

of one's wealth to the State) and Zakat (alms to the poor) provide a means of capital accumulation and redistribution, which are needed for the sustainability of the system (Chaudhry, 1999). A disadvantage of the Islamic economic system is that, individuals and small private sector enterprises are discouraged from seeking profit in business ventures as is the case in the socialist system. The Qur'an encourages cooperative societies and joint stock companies to start business ventures for the good of the broader society where all can be party to sharing of the accumulated benefits or profits (Ibid).

In summary on the hybrid systems, the mixed systems provide an appeal to RRA countries since it addresses the weaknesses of the capitalist and socialist systems. This, it achieves by redefining the principles to solve the weaknesses of each system to ensure stability, security and justice. Additionally, the Islamic economic system does provide another path but because of the challenge of 'no interest' (Reba), it will mean that countries accept the Islamic Faith and the practice of Sadakat and Zakat for the system to be self-sustaining. The Islamic economic system's model presents another path, which countries will not implement holistically because it relies on the Islamic belief systems; likewise, countries such as, Pakistan, Saudi Arabia, Jordan and others forgoing the system and applying the hybrid models of capitalism and socialism is not realistic. Matters of faith, which has been entrenched as a system cannot be easily replaced with new systems in the case of the Islamic countries. Nevertheless, in terms of RRA countries, elements within the hybrid system, which best suit Africa's unique context can be co-opted to enhance the current economic system in RRA countries as well as countries considering other alternatives to economic growth.

2.4 Why Capitalism (Market System) as the 'Best' Alternative?

The demerits of socialism have been acknowledged above, coupled with the challenges of the market forces in the allocation of resources under capitalism. As a result, calling

for renewed approaches to viewing economic systems may have to be considered in the context of RRA countries. To achieve this, the section analyzes which is the best between the market and the socialist systems. The *ten* (10) performance criteria defined by Grossman (1974) noted in section 2.2 is used as the criteria to assess the market and socialist systems in terms of forms, principles and the institutional contexts. This is done because of the predominance and historical applications of the two in SSA.

Table 2.1 compares the two systems using Grossman's *ten* performance criteria. The objective is to identify, which of the two is a better economic system and provides greater incentives for economic growth.

Table 2.1: Applying the Grossman Criteria- Market System versus Socialist System

Criteria	Market System	Socialist System
Plenty	The profit motive drives this system and constantly needs to accumulate capital for the system to be self-sustaining.	Profit is motivated by the State. Thus, the pace for plenty is driven by the State.
Growth	Growth in the market system is gradual after re-organisation of its fundamental institutions for increased growth.	Growth is directed by State. Growth is higher than the market system in the initial period and begins to wane due to challenges with allocative efficiency.
Stability	Stable but subject to business and financial fluctuations, often leading to regular crises (every 20- 30 years).	Perceived stability since ultimately government allocations may cover up instability.
Security	Less secure than the socialist system since self-interest motivates the need to make profit under this system.	More security under this system since government/State monitors economic agents.
Efficiency	Premised on the 'invisible hand' allocating resources within an economy. Thus, it is more economically efficient than the socialist system.	It's less efficient as a system than the market because government's allocation of resources is not left to the invisible hand.
Equity and Justice	Inequities and inequalities in incomes and wealth distribution are offshoot of capitalism. Pure capitalism extenuates poverty.	The fairness of the system is determined by the State officials. However, due to the system of fearmongering and rewarding of whistle-blowers, justice may not be served in many cases.
	This is determined by rule of law but there are underlying institutions that are pre-requisites for social justices. However, when they are weak, social justice becomes compromised.	The institutions for social justice under the socialist system are predicated on pre-defined rules and laws. Then again social justice is precedent on the benevolence of the government or State.
Freedoms	Individuals have the right to the market mechanism to determine the distribution and allocation of goods and services.	There is little freedom of thought and expression of views since the State determines all allocation and distribution of resources for the common good of society.

Environmental Protection	Left to the invisible hand of the market. More recently the passing of environmental legislations to govern environmental assets has become the norm.	The degree and extent of environmental protection are decided by the State but in concomitance with national objectives and availability of budgets.
Sovereignty	State steers resource allocation in the case of social goods but mostly the 'invisible hand' does the allocation of resources.	The State is the ultimate power and decides the developmental objective for the nation; as well as how resources are distributed.
Value system	Individualism, profit-motive, self-interest, decision-making is left to economic agents, etc.	State control; fear-mongering; self-interest is discouraged, etc.

Source: Researcher's Analysis (2016)

Against the criteria (refer to *Table 2.1*), the market system provides more incentives for growth, efficiency and freedom of enterprise unlike the socialist system. That said, the success of the socialist system is also dependent on the nature of the benevolent State or leader of the State in stimulating efforts towards growth. However, variants of socialism as was practiced in the USSR and communist China showed that collective ownership and the distribution of productive assets resulted in tyrannical and authoritarian leaders who suppressed the views of the collective (Schnitzer, 1999).

Under the market system (and pure capitalism), the invisible hand of the market removes such elements but is weakened by the self-interest and greed of individuals, who monopolize the power of the capitalist, and disadvantages the weak and poor in capitalist economies (see some of the noted weaknesses of capitalism in *Table 2.1*). Nevertheless, commentators such as Baumol *et al.* (2008); Clark (2015); Crotty (2001) contend that despite its flaws, capitalism fuels entrepreneurship, competition and innovation, which are the critical components to enhance productivity growth in an economy. If one uses real GDP (as an indicator) for productivity, growth in incomes in the past three centuries have proven robust in typical capitalist countries such as Great Britain, Netherlands, Italy, United States and Canada over purely socialist States. *Figure 2.1* shows the real GDP per capita between key capitalist nations and the combined of the countries that were part of the former USSR.

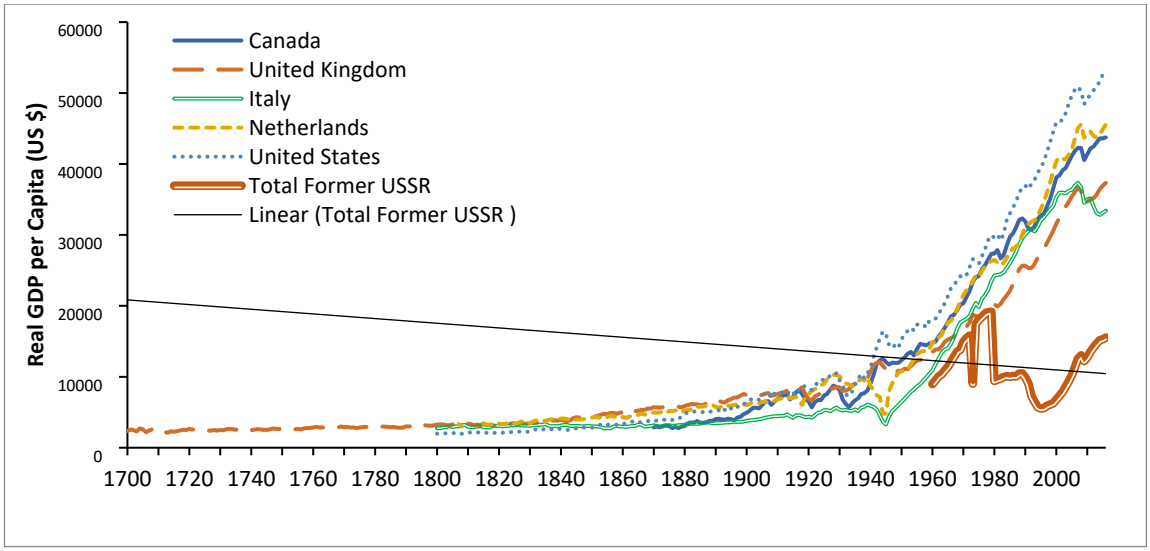


Figure 2.1: Real GDP Per Capita- Capitalist versus Socialist Countries
Source: Maddison Project Database (2018)

*Total former USSR countries consist of Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.
**Data could only be obtained from 1960s for the former USSR countries to 2016.

From *Figure 2.1*, there is a divergence in real growth per capita from 1980s for the former USSR countries, whereas growth rises for key capitalist countries dominated by the United States. Many reasons have accounted for this divergence, such as: demotivated State institutions, fear-mongering and the lack of the profit motive drive, which inhibits the drive to innovate (Reynolds, 2005). In the context of capitalism, it must be emphasised that the different variants and the dominant elements in each to a certain degree drives growth. To each variant of capitalism, some of the merits may be present in varying degrees to fuel growth. In the case of the United States, entrepreneurship coupled with private property rights, rule of law and competition have fuelled innovation unlike in some countries like modern China, where a state directed capitalism (or socialist-market) system perpetuates different kinds of incentives to fuel growth (see Baumol *et al.,* 2008).

Even in the case of Russia, some have argued that the unpreparedness after the fall of the communist era in the 1990s created windows of opportunity for oligarchies to be

created, which does not mean that an offshoot of capitalism is the creation of oligarchs. Oligarchic capitalism as noted by Baumol *et al.* (2008) is incentivised by corrupt leaders who prey on the masses to preserve their income and wealth; thus, in such societies, inequality and informality remain rife. According to Baumol *et al.,* (2008), for good capitalism to enhance economic growth, there is need for (1) an entrepreneurial economy, (2) institutions, i.e. rule of law, private property, (3) government institutions, which correct the failings of the system, (4) incentives for entrepreneurs to innovate. Baumol *et al.* (2008) further acknowledged that:

> *A small set of entrepreneurs may come up with the "next big things," but few if any of them would be brought to market unless the new products, services, or methods of production were refined to the point where they could be sold in the market place at prices such that large numbers of people or firms could buy them. It is that key insight that led us to the conclusion that the best form of "good capitalism" is a blend of "entrepreneurial" and "big-firm" capitalism, although the precise mix will vary from country to country, depending on a combination of cultural and historical characteristics* (Ibid, p. ix).

From *Table 2.1*, there are some merits of the socialist system, however the market system from the above discussions show promise as the best alternative. The early 1990s saw a global ideological shift to the market system as a more sustainable solution for enhancing growth because of the prosperity of early capitalists such as the United States, Great Britain and others (see *Figure 2.1*). Furthermore, reforms under the market and the new evolving forms of State capitalism in some emerging developed countries such as Singapore, Malaysia, South Korea, etc. have proven the market system's agenda (albeit mixed) as a favourable alternative for maximising welfares. This is despite the periodic financial crises, which the market system is prone to. The next part of the Chapter considers the key arguments and concludes on the market system as a favourable alternative with some recommendations.

2.5 Capitalism as a Viable System for Resource-Rich African Countries

Beyond the performance criteria and the arguments presented in Section 2.4**,** the shift from the socialist incentive (from the 1960s) to the market system (post-1980s) can be attributed to the fallibilities of a controlled 'State' system, which crippled many countries in Eastern Europe and some parts of Africa in the past. This led for example, to the disbandment of the USSR in 1991 and a re-orientation of socialist thinking to an opened economy in the 1980s and 1990s for many Africa countries. This paradigm shift, although debatable led to a moderate rise in GDP per capita for some countries, (with about 7% average growth rate in the last decade for a few countries) after the implementation of the SAP in 1980s.[25] Refer to *Figure 1.1: GDP, Gold and Copper Prices for Ghana, Tanzania and Zambia* (in Chapter One), which traced three RRA countries growth paths from 1950 to 2015.

Opponents of the market system have argued that empirical evidence of global performance during the onset of the neo-liberalist revolution has not led to dramatic positive outcomes since global growth and the rate of capital accumulation have been slow (Bakir and Campbell, 2009).[26] Inequality has increased with productivity growth having deteriorated over the years (Brenner, 1999; Crotty, 2017; Crotty, 2001; and Weisbrot *et al.,* 2006). It is also known for a fact that inequality and poverty are symptomatic of pure capitalism (Chang, 2011).

Even beyond this, there are also some of the inherent contradictions within the 'market system' that make firm the question asked earlier (in Chapter One), whether the system can sustain the agenda to accumulate especially at the global level, without creating masked inequalities and unemployment (see Marx, 1867; Bakir and Campbell, 2009;

[25] This was also discussed in Chapter One. Although, the shift led to rise in GDP growth, it was also pointed that mineral rents may have contributed significantly to growth in RRA economies.

[26] Bakir and Campbell (2009: p. 2-6) show in their paper a divergence between the rate of profit and the rate of capital accumulation post-2000. They conclude from their empirical analysis that the rate of capital accumulation under neoliberalism followed a slow decline after 1979-80 and has yet to recover.

Winternitz, 1949: p. 1-16 and discussions in Chapter One). In the final analysis, the answer lies not in condemning the system, but the opportunity it presents in correcting the failings within the market system during times of crises. As noted in the earlier discussions, capitalism is constantly evolving, and the shortcomings provide governments an opportunity to ‘steer’ and minimise the negative symptoms of pure capitalism.

Ultimately, because there are no suitable alternatives that can concurrently cause income growth and capital accumulation to facilitate global economic growth and development, the capitalist market system is the expected key mechanism for the distribution of wealth. This is despite its internal contradictions and shortcomings (Chang, 2011). Baumol *et al.* (2008) rationalised this point by asserting that entrepreneurial and innovative forms of capitalism must work in tandem with big-firm capitalism to stimulate late growth in developing economies. Capitalists "save" part of their profits for investment not because their "propensity to consume" is lacking; as capitalists, the probability of continuing their profitable business and ability to stand up against competitors depend on the amount of capital they command (Brenner, 1999). Therefore, accumulation of capital and not maximisation of luxury consumption is the driving force of the capitalist production- hence - its accomplished success of fostering competition and increasing capital for growth of national outputs in some countries.

2.5.1 Refining the Market System for Resource-Rich African Countries

With the market system being the most appropriate thus far, can the market system’s imperfections be re-engineered towards a sustainable path for optimal mining in resource-rich developing countries? The researcher opines that inherently, for the system to be efficient, it must be refined and work in tandem in achieving progressive

growth contingent on the national development objectives of African States. Since most countries are resource-rich in Africa, then the objectives and strategies must be centred on a mineral-led approach engineered by the market economic system.

Arguably, the economics of globalisation under the market has yet to institute global macroeconomic structures and institutions which can transparently and resiliently deal with the inflow of capital and capital accumulation (across regions) without recurrent financial crises (Bakir and Campbell, 2009). These apparent gaps between neo-liberal theory and global practice especially for the current patterns of capital spending and savings, and usually evident in north-north relations have led to a culture of personal enrichment (Chang, 2011). This is at the expense of many non-hegemonic developing African countries that are in dire need of productive capital to grow. Therefore, any attempts at reassessing the market economic system for RRA countries would have to bear in mind some of the characteristics of a pragmatically compromised existing 'neoliberal' agenda.

Nonetheless, the review of the history of economic systems, including the hybrid systems identified that some of the characteristics are still relevant for a refined view or Strategy for the market system utilizing a humanist approach. These features must be able to bear up (or be sustainable) in the long term as well as control for the outcomes of the nexus between the economy and the environment. The following sketch of some of the market's, socialist's and hybrid's characteristics and features which are essential for a refined approach of the market are enumerated below:

- a robustly defined private property rights;
- an interventionist State or government;
- a clearly defined economic criterion, (i.e. optimality versus sustainability, and/ or allocative efficiency versus technical efficiency) to govern the country;
- innovation to drive entrepreneurs to compete;
- social and public investments to build productive capital;

- positive incentives to boost effective demand and supply;
- social safety nets for social goods such as healthcare, education and employment;
- righteousness and the principle of reciprocity; and
- inclusive institutions that would ensure that the set national objectives of the State are met.

These identified features would have to be incorporated in any view of a system which must facilitate growth in RRA countries. The research further opines that devising a refined Strategy for RRA countries (bearing in mind the above elements), while taking into consideration the integration of the goals of SD and optimal mining can assist RRA countries toward growth and development. This is discussed as critical for the SED Strategy in Chapter Six. In countries where the context, for example, like South Africa is unique, approaches to dispel the legacy issues of apartheid regime must be instituted to ensure that every citizen has the opportunity to succeed. Here, a mix of social interventions aimed at building human capital to eradicate inequality in all its forms are pre-requirements for implementation.

A consensus in policy making is the need for country-level policy space which would have to be coordinated on a global level for coherence at the national level. Here, the UN systems' task team on the post-2015 UN development agenda contended that a coherent State is firstly needed; then, mutually reinforcing policies that support the agenda of growth and development. The coherence of such national policies must however be complemented by international level (or global) policies of relevance to the RRA context (United Nations, 2012; 2015). Some of the SD pathways provide an addition to the refining of the market system's approach for development, hence providing the policy space for countries to implement their national development strategies backed by global support.

For mineral economies in Africa specifically, such a refined view would have to be predicated on a clear understanding of the political economy of resource-rich States, and from a pure economic sense, a greater understanding of the economics of the minerals industry. This is discussed under the linkages between SD and optimal mining in Chapter Five. In retrospect, there exists a mismatch in terms of how the industry can objectively contribute to national economic development outcomes of developing resource-rich States in Africa, while being sustainable. Recognising the importance of the arguments in this Chapter for classical theories under the market system, there needs to be a clear understanding of optimal mining, in terms of how to generate, capture and manage rents, for it to lay the foundation for an SED Strategy for RRA countries.

2.6 Conclusion

This Chapter discussed economic systems and rationalised why there is merit for the neo-liberal approach under the market system. In addition, since the policy environment in the global arena as well as in most countries has shifted to the market system, nation States in Africa should resort to this system; albeit with a refined view for sustainable growth. Considerations for such a refined or re-engineered market system were stated for an SED Strategy for the continent. In this light, the next Chapter discusses the principles of SD and the applications of the concept in Africa. It presents the challenges of SD in mining countries, the current and emerging issues in the debate, and way forward for mineral economies in Africa.

Chapter 3

Sustainable Development and 'Issues' in Mining

"No single blueprint for sustainability will be found, as economic and social systems and ecological conditions differ widely across the globe. Each nation would have to work out its own concrete policy implications" (WCED, 1987: p. 11).

3.1 Introduction

This Chapter discusses the literature on SD and narrows down to mining and sustainability in industry and mineral economies in Africa. It traces the evolution of SD and mining, and the foundations of the Mining, Minerals and Sustainable Development (MMSD) report which interpreted the meaning of SD for the industry. It discusses some of the elements of what SD means for mineral economies, and the challenge of realizing the concept when the pre-conditions for SD are weak with sub-optimal governance frameworks. Also, it postulates that the interpretation of SD in terms of the triple bottom line model is challenging for States where the surplus value for re-investments is critical for optimal mineral development. The Chapter also lays the foundation for taking stock of SD and its applications in Chapter Four.

3.2 Sustainable Development and Mining- What has been done so far?

After the first global responses (see discussions in section 1.3 of Chapter One), the Brundtland Commission (WCED, 1987) introduced the new concept of SD. It proposed the importance of 'needs' and 'limitations' on the part of both developed and developing economies in cooperating to meet the challenge of underdevelopment, poverty, and environmental protection.[27] Many studies and research to transition the

[27] MacNeill (2013) who first coined the term SD in 1987, argued that the Commission found that the environmental-protection agenda, which nations adopted before and after Stockholm (i.e. IUCN, 1980; UNGA-

new concept of SD became the focus of development economics and scientific communities.[28] In furtherance to this, the United Nations (UN) declaration in 1992 set the tone for the principles and framework for SD. Out of the [18] principles that were originally developed, only [5] had a direct relationship between mineral resources, the environment and economic development. These five are noted below:

- development today must not undermine the development and environment needs of present and future generations;
- nations have the sovereign right to exploit their own resources, but without causing environmental damage beyond their borders;
- nations shall develop international laws to provide compensation for damage that activities under their control cause to areas beyond their borders;
- in order to achieve SD, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it. Eradicating poverty and reducing disparities in living standards in different parts of the world are essential to achieve SD and meet the needs of the majority of people; and
- the polluter should, in principle, bear the cost of pollution (UNCED, 1992).

Interestingly, the focus of the principles by UNCED was on environmental protection amid the pursuance of certain 'harmful' economic activities, of which mining was a chief suspect. Thus, in coming to terms with the new framework and principles, MNCs realised that mining issues were somewhat subsumed into general issues of environment, and therefore, needed to bring to light how mining can contribute to the SD agenda in industry.

UNCHE, 1972) tackled only the *symptoms* of environmental degradation; it completely ignored the *sources*. From his testimony, the Commission realised that the sources were to be found not in the air, soil, and waters, which were the focus of the environmental-protection agenda, but in a whole range of perverse public policies, especially fiscal and tax policies, energy policies, and trade, industry, agriculture, amongst others (MacNeil, 2013).

[28] See for instance various publications by the CSERGE series at (http://www.cserge.ucl.ac.uk/index.html); other studies sponsored by governments such as the Australian SD framework (see Mudd, 2009); and Canada's Whitehorse Mining Initiative- Towards Sustainable Mining launched in 2000 (The Mining Association of Canada, 2015).

3.2.1 The Mining, Minerals and Sustainable Development Initiative

The Global Mining Initiative was initiated by Rio Tinto, Anglo-American, BHP Billiton Freeport-McMoRan, Newmont and the World Mining Congress. Emphasis was placed on the establishment of a two-year Mining, Minerals and Sustainable Development (MMSD) research initiative (from 2000 to 2002) after the Agenda 21 Conference in Rio where the principles of SD were developed. This was organized by the World Business Council for Sustainable Development (WBCSD) and housed by the International Institute for Environment and Development (IIED).

The purpose of the MMSD initiative was to facilitate the movement towards a shared agenda involving all the main stakeholders, since 'Principle 4' of the Rio Conference declaration stressed the need to "protect and manage the natural resource base for social and economic development" (UNCED, 1992; IIED- MMSD, 2002).[29]

The established consensus on SD during the writing of the MMSD report was that the integration of SD under the 'pillars' of economic, environment and social within a governance framework represented the point of true sustainability.[30] This definition adopted from Barbier (1987) and Munasinghe (1992) studies is highlighted in *Figure 3.1*.

[29] The objectives of the MMSD were to: assess the global mining sector and its transition to SD; identify how services provided through the mineral supply chain can be delivered in a SD manner; propose elements to improving the minerals system; and build platforms for analysis and engagement of all stakeholders in the sector (see IIED, 2002:42).

[30] Munasinghe (1992) conceptualised the three elements of SD as encompassing the social, environmental and economic aspects. Harris (2003) identified what the three dimensions are and the goals, which direct each system. Towards the end of Harris's (2003) paper, he synthesized all three perspectives into a common framework and concluded that each system poses challenges which are social and institutional as well as economic. Above all, the institutional and governance elements will have to be adapted to all three perspectives in SD.

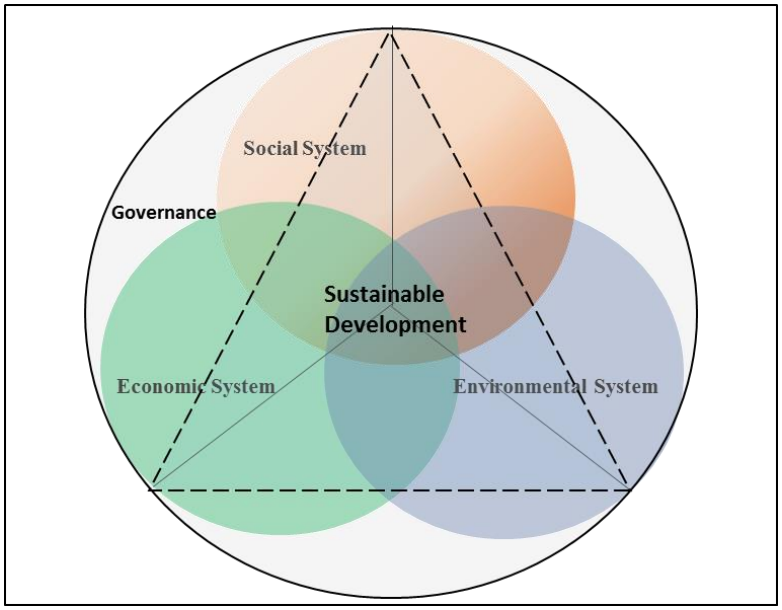


Figure 3.1: Sustainable Development within the Matrix of Governance
Source: IIED-MMSD (2002)

From the figure, the point of true sustainability is where the economic, natural and social systems intersect within the framework of governance. The sphere of the economic system maximizes well-being through efficient use of all resources and enhances the conditions for increase in returns and investments from mineral wealth. The social sphere balances a fairer distribution of costs and benefits on both society and mining companies. The environmental sphere, which has been maximised by the proponents of SD seeks better stewardship of natural resources and remediation of past damages along the mineral value chain. This is facilitated through good governance, which is aimed at synchronising the interests and stake within the three systems of SD (IIED-MMSD, 2002).

Although, there have been applauses for the laudable efforts of the MMSD, Crowson (2002) asserted that the MMSD is "…no more than a recycling of currently fashionable ideas and phrases, preceded by an alarmist sketch of the world today and laced with some crudely misleading economic history." Crowson (2002) posited that the MMSD has "dignified" NGOs as civil society and further purported that if

implemented, the MMSD's current recommendations would be ‘less effective, not more, in contributing to the general welfare’ (cited in Whitmore, 2006, p. 234). Such reactions after completion of the report were very common in quarters that dispelled the notion that sustainability could be achieved by an industry long devoid of controls (Ibid).

In spite of the assertions by Crowson (2002), The MMSD+10, which was an update of where the industry currently stands argued that the dialogue and policy space have improved for the industry (Buxton, 2012). The International Council on Mining and Metals (ICMM), which was instituted to transition the recommendations of the MMSD has also taken a new approach to viewing the concept. In a recent ICMM report, it was highlighted that the council would take the approach of a ‘contribution analysis’ and net benefits of minerals in improving society on the whole as its current interpretation of SD (ICMM, 2012a).

The focus on ‘contribution’ is a tougher but fairer approach (ICMM, 2012a, p.5). The ICMM (2012a) argued that SD must be envisioned in the political and social arena, where a mining licence is both legal and social. Legal in the sense that the operation is considered because the negative impacts are defined and adequate steps can be put in place to mitigate, and not just the traditional positive return on investments (ICMM, 2012a, 2012b). The social dimension should also be a consideration, in that the project has approval from communities in which operations take place (ICMM, 2012a).

3.2.2 Post-2015 Development Framework

Before delving deeper into SD and its challenges in mineral economies, the section considers the global view of SD and the consensus at the global stage. Where do global SD concerns currently lie? From current assessments in UNCSD (2012); and United Nations (2005, 2012, 2015a), the approach of striking a balance between the three

systems is still the view of global governance systems, with the discourse currently systemised under the post-2015 development framework. As a replacement to the Millennium Development Goals (MDGs), the Rio+20 agenda passed the Sustainable Development Goals (SDGs) in September 2015 signed by 193 countries (United Nations, 2016). Seventeen (17) SDGs with 169 targets have been endorsed by world leaders with the view to achieving all these goals and targets by the year 2030 (United Nations, 2015b).[31]

This new Agenda 2030 provides a successor framework for the Millennium Declaration and the MDGs; and is a plan of action for social inclusion, environmental sustainability and economic development, according to the Columbia Center on Sustainable Investment- (CCSI and UNDP, 2016). Mining's contribution to the SD goals have been clearly affirmed in a recent study by the CCSI in partnership with the World Economic Forum (WEF) and the UNDP (see CCSI-UNDP, 2016). The studies mapped out the direct and indirect linkages between mining and the SDGs, with current industry best practice and examples that are in the process of contributing to the goals. The atlas of the report also identified certain opportunities of how mining companies can collaborate with other stakeholders to leverage on common resources with the aim to avert negative disasters from mining activities. In so doing, the positive contributions of mining activities can enhance the fulfilment of the SD goals (Ibid).

Per the CCSI-UNDP (2016) report, all the 17 SDGs have some relevance to mining activities and within the different stages of mining's life cycle. Some of the goals have a more direct relevance to each of the different stages within the value chain, whereas

[31] The post-2015 development framework, which led to the SDGs argued that the goals should be developed within the framework of "unified but differentiated" principles, in order to address regional and national circumstances and local priorities (United Nations, 2015c). Thus, the differentiated targets within the SDGs are meant to cover the different levels of development of each country.

others may be indirect or may differ. Thus, contribution to each goal may take "a different form depending on the phase of the mining activity and this should be considered when assessing where the main opportunities for contributions are" (CCSI-UNDP, 2016: p.11).

Table 3.1 adapted from the CCSI-UNDP (2016) report summarises the 17 goals and categorises, which goals have a direct and indirect impact on the mining industry.

Table 3.1: Categorising the SDGs' Impact and Mining

Summarised Sustainable Development Goals		***Impact***
Goal 1	End poverty in all its forms everywhere	Direct
Goal 6	Ensure availability and sustainable management of water and sanitation	
Goal 7	Access to affordable, reliable, sustainable and modern energy	
Goal 8	Sustainable economic growth, productive employment and decent work	
Goal 9	Sustainable industrialization and foster innovation	
Goal 12	Ensure sustainable consumption and production patterns	
Goal 13	Take urgent action to combat climate change and its impacts	
Goal 14	Conserve and sustainably use the oceans, seas and marine resources	
Goal 15	Sustainable land use	
Goal 16	Peaceful and inclusive societies for sustainable development	
Goal 2	End hunger, achieve food security, and promote sustainable agriculture	Indirect
Goal 3	Ensure healthy lives and promote well-being for all at all ages	
Goal 4	Equitable quality education and promote lifelong learning opportunities	
Goal 5	Achieve gender equality and empower all women and girls	
Goal 10	Reduce inequality within and among countries	
Goal 11	Sustainable cities and human settlements	
Goal 17	Strengthen implementation and global partnership for SD	

Source: Adapted from (CCSI-UNDP, 2016)

In terms of the goals, a thorough assessment reveals some of the SD challenges which were defined as regional goals in the ECA's sub-regional studies towards the post-2015 development framework. Some of the challenges identified by the ECA, included inadequate guidelines to operationalise the various aspects of SD, particularly issues of environment and the artisanal and small-scale mining (ASM) sector; implementation deficiencies; and ineffective regulations for the SD of the sector generally (see ECA, 2013a; 2013b; 2013c; 2013d). It can broadly be asserted

that the concerns from the sub-regional assessments are reflected in the global SD goals and targets.[32]

All in all, although the evolving concept of SD (currently at the goal and agenda setting stages) has stipulated principles for global resource governance, the overriding challenge of how to support countries at various levels of economic development to work together to end extreme poverty, transition to a low-carbon world energy system, ensure food and water security, reduce high fertility rates, and make the world's cities productive and resilient to environmental stresses still remain outstanding (Jeremić and Sachs, 2013).[33]

Specifically, for RRA countries, the complexity of natural resource-led growth with its unique challenges coupled with the interrelationship with the environment at the various levels- global, regional, national, and local complicate the agenda of SD. This is obvious for the goals that are of direct relevance to mining, see goals 1, 6- 9, and 12- 16 (in *Table 3.1*). Even at each stage of mineral development for RRA countries, the complex interaction is compounded by challenges of political-economy issues of weak governance, lack of technical capacity, and institutional rigour to deal effectively with the use of rents, as was rightly asserted by the (ECA, 2012b).

3.3 The Challenge of Sustainable Development

The priority of meeting SD goals has been of high relevance to the mining industry, with the post-Wold Summit on Sustainable Development (WSSD) outcome leading to

[32] In the context of gold mining at the ASM level, the SD goals especially the directly relevant ones may have a tremendous impact on the business of ASM operators in their use of mercury and other extraction techniques. However, in the CCSI-UNDP report, the ASM sector was not included in the analysis, as such, there is need for detailed studies on the impact of the SDGs on the ASM sector since it is an important component of rural economic development in the African context.

[33] The fair balance is amongst the greatest challenges of SD in our time amid striving to achieve the targets set by the global governance bodies.

the founding of the ICMM with 18 gold mining industry players as key drivers when it was formed (IIED-MMSD, 2002). To a considerable extent, SD has changed the *business as usual* approach of the industry with many of the industry players reporting on voluntary initiatives to support efforts toward sustainability.

For instance, concerns by governments and increasing capacity of developing countries to monitor mining companies have been spearheaded by many developed countries' efforts such as the Dodd Frank Act by the United States and the Extractives Industry Transparency Initiative (EITI) on transparency in the payment and use of mining revenues, International Finance Corporation (IFC) performance standards, Organisation for Economic Co-operation and Development (OECD) due diligence on mineral supply chains, etc. Although this perpetuates a paternalistic culture of guardianship on the part of developed to developing countries, some of these initiatives have enhanced the capacity of stakeholders to hold governments and companies accountable (refer to Annex 3.1).

Also, through the MMSD initiative for example, the ICMM has developed ten (10) SD principles, which also take cognisance of the economic, social, environmental concerns of sustainability and mining's role in fulfilling SD goals and ends (ICMM, 2003). However, the ICMM's regulation of the sector will be tested in the phase of scaling back goals 6, 7, 13 and 15 (refer to *Table 3.1*).

In terms of providing some detailed discussions of the challenge of SD, the next section's discussions narrow down the arguments in two strands - the nature of industry's sustainability and the contribution of mining at the national level in the face of sustainability challenges in Africa.

3.3.1 The Mining Industry's Sustainability

Since the Johannesburg Plan of Implementation (JPOI) report (WSSD, 2002), companies have strived to achieve sustainability by benchmarking their activities with global voluntary initiatives and principles to monitor the impact and effect of mining activities. A significant example is the Global Reporting Initiative's minerals and metals supplement (GRI+MMS). However, with growing decline in mineral reserves, lower ore grades from current and new mineral projects, and the added burden of skills shortage, the risks associated with mining have escalated, making profitability difficult when cost optimisation strategies are not well instituted (KPMG, 2014a; Holland, 2013; Sustainalytics, 2011).

Observably, during the boom years, social risks, such as increased regulation, social licence to operate (SLTO), skills shortage and resource nationalism were on top of the agenda for sustainability by mining companies (see Ernest and Young- E & Y, 2015). Even in the midst of the seemingly rising mineral prices after the financial crises of 2008 (see *Figure 3.2*), the cost of producing minerals, or for instance an ounce of gold had risen exponentially compared to a decade ago (Fulp, 2015; PricewaterhouseCoopers- PwC, 2013). This is in addition to the extensive list of risk factors stemming from economic, environmental and social costs, which in turn make the sustainability of mining difficult.

For example, the analysis of mining revenues and costs from PwC's Mine Editions 2013- 2017 confirms the excessive costs incurred (largely from labour, reinvestment of capital and other working costs). Data from Mine 2013 edition shown in *Figure 3.2* breaks down the mining revenues and costs borne by mining companies, whereas *Figure 3.3* highlights the poor posture of industry from the financial data of the top 40 global seniors from between 2012- 2016.

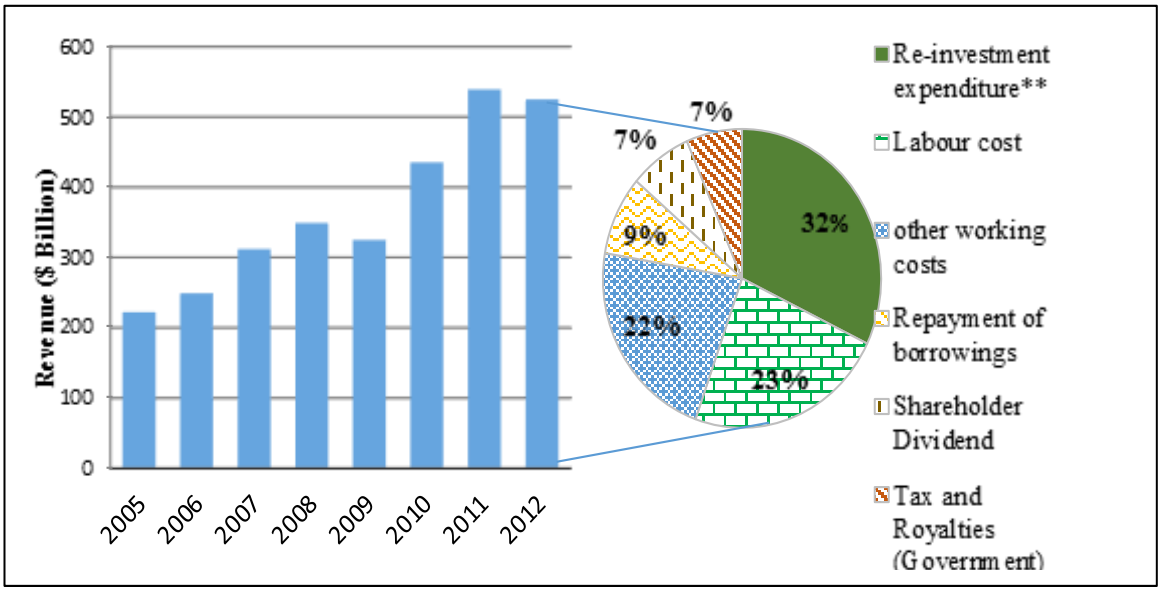


Figure 3.2: Mining Revenues and Costs- Top 40 Mining Companies (2005-2012)

Source: Adapted from PwC (2013) analysis of *Mine: A Confidence Crisis*.

**The re-investment expenditure represents the 'net investing cash flow' from the cash flow statement. It is inclusive of ($138Bn) which was reported as being spent in that year plus other investment expenditures made to ensure the long-run and continuity of mining businesses. Data for the assessment was extracted from the PwC 2013 report).

From *Figure 3.2*, it can be inferred that certain direct stakeholders that lay claim in the production function might not necessarily be receiving a fair share of the mining revenue pie.[34] The higher the costs in operation and management- the lower the profits obtained from the production function. Interestingly, net profit for the year 2012 was highest in the last five years for miners. The year 2015 however saw a negative net profit coupled with lower mining revenues compared to the boom years (see *Figure 3.3*).

[34] The SD agenda and its call for global environmental governance has brought to bear issues of sustainability and inclusion of environmental expenditures for cleaning-up and the rehabilitation of mining areas in integrated financial reports. However, interestingly, the majority of the financial reports do not integrate environmental accounting in their financial statement, nor do they typically report their environmental expenditure in their financial accounts statements. Typical integrated reports by mining companies are usually sectionalised under strategy, governance, orebody (mineral resource and reserves), sustainability and financial accounts, which are then co-opted into a report.

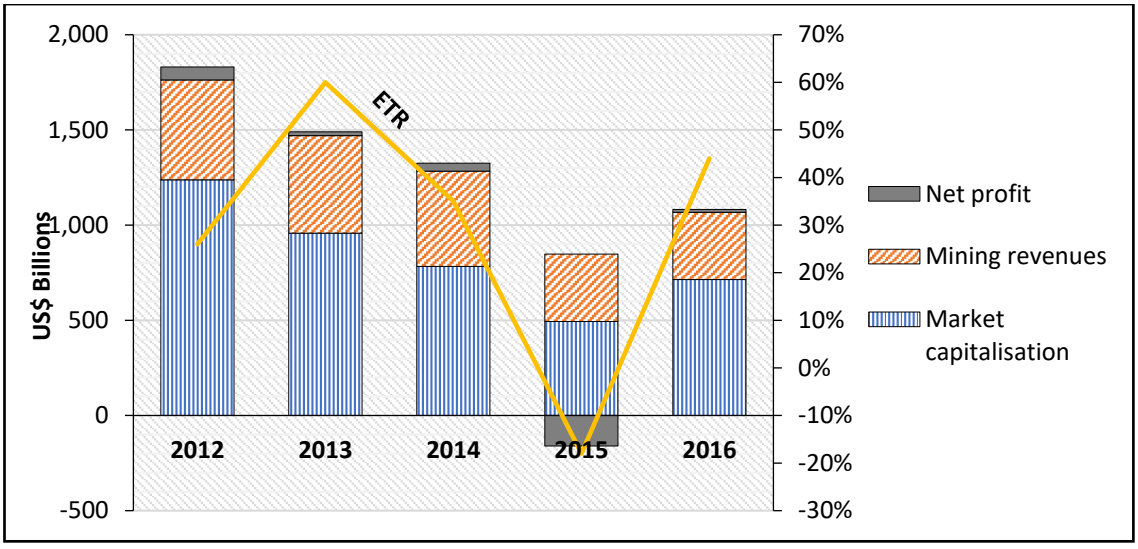


Figure 3.3: Some Financial Data of the Top 40 Mining Companies (2012- 2016)

Source: Adapted from PwC (2017, 2016, 2015, 2013) *Mine editions*.

*ETR- Effective tax rate

From *Figure 3.3*, market capitalisation in 2016 showed a rise from 2015, with effective tax rate at 44%. Although mining revenues were higher during the boom years, current gains as a result of rising commodity prices signal a boost in investor confidence (see analysis of price to earnings ratio in PwC, 2017). Despite these, PwC (2017) postulates that the market is bouncing back amidst a rise in commodity prices, particularly for gold and copper.

Consequently, it is important to note that expanding risk factors increase the size of the shareholders of the *mining pie*, as well as mining's cost of extraction, making it difficult to balance the management of environmental and social costs. Holland (2013) and Crowson (2001) concerning mining revenues and profits have also brought to bear the less dominant issue about the profitability of the industry being compromised.[35] This is especially so, in an era where CSR and corporate citizenship of minerals have been heightened. Here, shareholders, governments, communities and citizens are holding

[35] See Holland (2013) arguments on the need for the gold industry to concentrate on growing the mining pie (earnings) together with all vested stakeholders.

mining companies accountable for social and environmental due diligence that were previously neglected.

All in all, although industry attempts are laudable, the rising *differential* costs may reveal the cracks in the current economic models of profitability if demand and supply trends and government attitudes in terms of sustainability do not change for the industry.

3.3.2 Sustainability in Mineral Economies in Africa

Generally, mining contributes significantly to the SD of mineral economies. The ICMM (2014) pointed to the immense economic contribution of gold and other major metallic minerals, such as copper, bauxite, steel, tungsten, columbite-tantalum to the resilience of emerging economies in Africa. Per the ICMM (2014) report, mineral economies benefit generally in the context of about 60%- 90% in FDIs, 30%- 60% in export earnings, 3%- 20% in mining revenues or receipts, and 1%- 2% in direct employment, with many indirect multipliers across the value chain and in the economy (Ibid; p.18).

Governments, using fiscal instruments and sometimes local content policies (although not highly effective) are maximising the fiscal space to harness rents for development. Additionally, governments are also mitigating the environmental consequences of mining's impact through firmer environmental legislations and to effect equity in the distribution of mineral rents (Ramdoo, 2016). However, the greatest challenge of sustainability in RRA countries has been trying to secure an optimal and fair balance between fiscal instruments in taxation, social concerns, and environmental regulations in the face of the volatility of mineral prices and rents.

During the aftermath of the Rio Declaration, environmental regulations, laws and policies were prioritised to off-set the externalities from mining. Major concerns about the impact of mining on the environment led to the crafting of the National Strategies for Sustainable Development (NSSD) in 2005 onwards to provide environmental safeguards in economies to drive sustained growth (United Nations, 2005). However, as to whether mining countries have been fully successful in pursuing the agenda of sustainability and the implementation of its principles have been a key point of contention- the Thesis discusses this in the next Chapter.

3.3.3 Conclusion on Sustainable Development in Africa

In the JPOI and the Rio+20 reports (UNCSD, 2012; ECA, 2013; WSSD, 2002), it was acknowledged that economic development has been constrained in Africa due to poverty, conflict, lack of infrastructure, technological improvements and institutional quality; thus, preventing the full transitioning of the concept of SD. Apart from these, the pre-conditions for SD such as good governance and leadership are weak leading to implementation deficiencies (ECA-AU-AfDB, 2012; ECA, 2012b).

According to the ECA-AU-AfDB (2012), SD outcomes can be enhanced in Africa, through:

- Better integration of the principles of SD into policies and programmes at the national level;
- Progress in the formulation of programmes that will operationalise SD in countries;
- Providing guidelines for a system of SD indicators that can enable measurement and comparability of countries;
- Strong institutional and research capacities and support to strengthen SD pillars;
- Reforms in current educational curricula to support understanding and operationalising of SD at all levels;

- Improve cooperation and coordination among national agencies and all stakeholders in a nation for coherence;
- An accessible information network that provides platforms for sharing challenges and progress made in SD;
- An integrated regional SD framework and action plans to guide national efforts in realising SD at all levels;
- Increasing stakeholder engagement and participation on SD issues to raise awareness and safe spaces for open discussions of SD; and
- Intervention in capacity-building to facilitate the SD process.

All things taken into consideration, because of the lack of the enumerated interventions noted above, many countries have failed to fully integrate the concept of SD into their mineral economies. To further buttress this point, *Table 3.2* showcases a list of mining countries that have integrated the NSSD principles or ratified Agenda 21 principles in their development frameworks. The rationale for presenting the table is to identify whether current national development policies have incorporated an integrative and cohesive sustainability agenda/ framework specific to mineral economies in Africa.

Table 3.2: National Sustainable Development Policies in Mineral economies

RRA COUNTRIES	SD FRAMEWORKS: NSSD/ PRSPS/NDP‡	SD FRAMEWORKS SPECIFIC TO MINING†	MINING SD INDICATORS @ NATIONAL LEVEL†	MINING SD INDICATORS @ PROJECT LEVEL†
Botswana	✓	S	✓	x
Burkina Faso	✓✓	✓	x	x
DRC(Congo)	✓✓	✓	x	x
Eritrea	✓✓✓	✓	x	x
Ethiopia	✓✓	✓	x	x
Ghana	✓✓✓	✓	x	x
Guinea(Conakry)	✓✓	✓	x	x
Ivory Coast	✓✓✓	✓	x	x
Kenya	✓✓✓	✓	x	x
Liberia	✓✓✓	✓	x	x
Madagascar	✓✓	✓	x	x
Mali	✓✓✓	✓	x	x
Mozambique	✓✓✓	✓	x	x
Namibia	✓✓✓	S	x	x
Niger	✓✓	✓	x	x
Sierra Leone	✓✓	✓	x	x
South Africa*	✓✓	S	S	S

Tanzania	✓✓✓	✓	x	x
Zambia	✓✓	✓	x	x
Zimbabwe	✓✓	✓	x	x

Source: Author's research from the NSSD Reports (see ECA, 2011)

‡ NSSD- National Strategy on Sustainable Development-✓/ PRSPS- Poverty Reduction Strategy Papers-✓/NDP- National Development Plan-✓; †✓- Yes, has a Mining Law, but does not have a specific (or cohesive) SD framework to integratively deal with issues from the mining sector; **S**-Has specific SD strategy tailored towards the needs of the Sector**, X**- No, does not have a sector specific indicators framework to monitor progress in mining. The above data on countries that are RR is extracted from the Fraser Institute's Mining Survey; however, the Researcher embarked upon the actual assessment of countries in terms of availability of SD frameworks.

Some of the resource-rich countries like Central African Republic, Cote D'Ivoire and Mauritania were not included in the in the assessment due to language barriers and lack of data available on their mining sectors.

* South Africa has had its own medium-term development frameworks. Thus, it didn't receive the black tick mark for alignment with the PRPSPs. Its aligned its development frameworks with mining (see Annex 8.3a).

Tracing from the *Table 3.2*, a significant majority of RRA countries do not have holistic and integrated SD specific strategies to tackle mineral-related externalities and as well effectively harness rents. Although, they do have an overarching mining law or framework (and its supporting laws, such as environment, health and safety and other mining support regulations) for the minerals sector, the laws are siloed in approach and implementation.[36]

In the final analysis, it must be pointed that the transition of SD from its initial conception in 1987 by the Brundtland Commission to the SDGs is a huge feat, coupled with the principle of inter-generational equity between present and future generations. This notwithstanding, as a concept, SD's interpretation has been limited by the balancing components definition found in the triple bottom line, which often leads to issues of trade-offs within mining systems. As indicated in the opening quote, regions and countries would have to define what sustainability means to them and re-interpret the concept to suit their own context (WCED, 1987, p. 11).

[36] James Otto's contribution to the UNCTAD series on *Mining, Environment and Development* also sheds light on the challenge of integrating environmental regulations into mineral governance (See UNCTAD, n.d.). Sometimes, working from different departments with different mandate and goals can be streamlined if cohesive plan of inter-sectoral cooperation exists. In a similar instance like land use planning, Mbaya (2016) suggests an integrated national policy to guide sectoral policies in land management. Such frameworks should be devised for the mining sector in Africa.

3.4 Emerging 'Issues' on Mining and Sustainability

With the above discussions in mind, this final part of the review gleans the critical issues from the mining and sustainability debate. From the previous discussions, five critical issues in the mining and sustainability debate can be gleaned. These are:

a) the definitional *challenges* within SD and mining discourse, i.e. who is defining SD and whether it's in conformity with the realities of countries;
b) that ore bodies are scarce, finite and hence unsustainable;
c) environmental degradation caused by mining are detrimental to ecosystems, when mining regimes are weak;
d) the profitability of the industry being at stake; and
e) the sharing of benefits equitably and how the benefits should be used.[37]

To contextualise the debate, the themes are further grouped and discussed under four headings: definitional challenges in SD, geographical reach of SD- global, national and local levels, profitability of the industry in the face of sustainability and the environment and development nexus.

3.4.1 Definitional Challenges in Sustainable Development

The first issue is premised on the contested and broad nature of what SD means or how it should be defined or (interpreted) by the mining industry. Persistently, the challenge for mining and sustainability has been how to arrive at a 'common interest' definition or an 'economic' definition of SD to facilitate the profitability of the industry (IIED-MMSD, 2002). In the MMSD and even the current global SD agenda, the triple bottom model is the interpretation of sustainability which highlights concerns within the economic, social, environmental, and governance dimensions (see Section 3.2.1). Practically, the understanding of this interpretation is bent towards a combination of two issues generally, both 'environment and economics', 'social and

[37] See *Breaking New Grounds: Mining, Minerals and Sustainable Development* on three of the identified themes (IIED-MMSD, 2002: p. 80).

economic' and 'environment and social' or other variations of the two combinations in terms of application. Even in cases where there can be an intersection of all dimensions, there is a possibility that the profitability of the industry could be compromised due to imbalances within the three elements when the governance dimension is weak.[38] Currently, the focus of SD has been maximising the concerns in the environment and social systems thus weakening the effect of the economic dimension.

3.4.2 Geographical Reach: Global, National and Local Levels

Another gap in SD and mining is the interconnected and interdependent nature of the mineral value chain in terms of processing and product development within the global mineral system. Rapid growth in consumer demand and production as a result of globalisation has given SD a cross boundary geographical reach with both physical and economic manifestations. Inferably, because resource-rich developing countries have ratified many international initiatives set-up particularly at developed countries' standards, these initiatives are becoming models or systems for the developing. In many cases these standards are super-imposed based on certain conditionalities (or pre-conditions) tied with aid funding, and thus, may often lack context in the face of weak governance.

Until recent efforts at SD and mining by the ECA and the AU with the African Mining Vision (AMV) and other localised mining initiatives, many SD attempts at the regional and national levels have been driven by the larger global SD agenda. Some of these initiatives have little context (or have higher ethical standards in terms of execution) in the countries that these policies are geared towards. The recent global SDGs is an

[38] See Memary *et al.* (2012) and Pearce and Barbier (2000). Also refer to arguments on total factor productivity in mining by Humphreys (2001).

exception because of its multi-regional approach and the incorporation of some of the issues in the Common African Position (CAP) on the Post-2015 development framework report.

The CAP's recommendations ensured that key SD concerns of the region were considered in the formulation of the global SDGs (see AU, 2014a). In spite of these, global and regional pollution of ecosystems as it pertains to mining necessitate the reasons for global governance. However, the question remains, in whose interest or real needs are being addressed or defined in SD? The researcher posits that SD is an appropriate framework; however, the *'balanced components'* definition remains problematic to the industry, when some of the minimum pre-conditions for economic development, governance and institutional quality have not been met by RRA countries.

3.4.3 Profitability of the Industry in the Face of Sustainability

Due to the risky and highly capital-intensive nature of mineral economic activity, the approach for mining companies would require greater compensation for going ahead with mining operations in regimes of political and physical uncertainties. Different mineral resources offer different scenarios for costs (Giurco and Cooper, 2012; Mason *et al*., 2011), but with increasing internalisation of environmental and social benefits, there would be the likelihood that in some countries mining would be unfeasible (Ibid). This also means that in resource-rich countries (that have understood) the impact of rents, a portion of the receipt of adequate compensation for all stakeholders must be re-invested for the sustainability of the project before exhaustion - this is having a lifecycle approach to rent management. The major point here is that, the key principle that can integrate all the concerns in SD is a re-investment of 'surplus value' obtained

from mining. This is to allow for greater sustainability concerns on the part of government and the industry.

In the theory of the markets, what allows sustainability of capital is re-investment of surplus value (profit) as was discussed in Chapter Two. However, rarely would one find 'wealth funds' dedicated solely to minerals in which African governments strictly adhere to its fiscal rules for mining revenue investments (except for the cases of Botswana, Libya and Algeria to a certain extent). Although not the only way, it is such macroeconomic discipline that can strengthen the use of mineral rents for long-term economic growth in light of SD principles.

3.4.4 Environment and Development Nexus: What to Prioritize?

Understandably, some developing countries in their current stage of development require and are needful of mineral rents to develop, grow and thereby reduce poverty. Therefore, mineral economies should weigh the options and the impact of economic rents as it pertains to sustainability. There is a divide between what developed countries want and need and what developing RRA countries really need (Jasanoff and Martello, 2004). Moreover, depending on one's disposition as an ecologist or economist one would tend to interpret SD in that context (Lele, 1991). Annex 3.3 show various perspective of the North and South in terms of sustainability. Based on the different perspectives, it is the researcher's opinion that the call for environmental sustainability should not tramp the fact that poverty and underdevelopment is a real phenomenon in developing countries that depend on the export of mineral commodities for profits and rents. Hence, there should be a reasonable balance between meeting the objectives of environmental and economic development in SD, and providing effective solutions to transforming exhaustible resources during the life span of minerals' extraction.

Finally, the dearth of data on SD pin points to the need of collecting data and identifying relevant indicators to better measure SD and define the necessary and sufficient conditions for economic development and environmental stewardship in Africa's unique context. This was also argued in the summary report of progress towards SD in Africa by the ECA-AU-AfDB (2012).

3.5 Conclusion

In concluding this Chapter, it is imperative to emphasise a few points. First and foremost, it is a truism that ore bodies are unsustainable, and as such it is an injunction on all countries not to waste resources (WCED, 1987). However, some developing countries in their current stage of development need mineral rents to develop and optimally invest mineral rents for long-term sustainability.

Secondly, the different manifestations and the geographical reach of SD points to the peculiar goal-maximising objectives of each region, country and locale. Hence, the necessity for key stakeholders to arrive at a common interest definition of what SD should mean for them and their unique context. At the industry level, since mining's profitability considering SD concerns are being integrated into the 'mining pie' (see *Figure 3.2*), issues of CSR and social licence to operate of mines must be a critical part of the mining business agenda. This means that sustainability issues must be well-defined to factor the concerns of all encumbered and to ensure that mining is profitable and benefits all stakeholders. [39]

Finally, due to the strong global influences toward the global level impact of SD in the 'development' discourse, there remains a gap in terms of adequate national level benchmarks for insuring the local impacts of SD by mining activities (this was stated

[39] Chapter Five considers this argument in detail.

as an objective of this Thesis). Therefore, there should be calls for better indicators for measuring SD in mining and a re-definition of SD for mineral economies. Would a re-assessment of the current view of SD in terms of practical applications lead to the conclusion of the weaknesses in achieving the balancing act for RRA countries? And would that mean that mineral–rich countries must reassess how SD is interpreted in policy applications?

To answer these questions, the next Chapter applies the MMSD interpretation of SD to gold mining economies. It aims at discussing the goodness of fit of the concept in four selected countries and to draw lessons of SD applications in Africa *vis-à-vis* considerations for optimal mineral development.

Chapter 4

Measuring Sustainable Development at the National Level

4.1 Introduction

This Chapter measures SD at the national level in four gold mining countries (Ghana, Democratic Republic of Congo- DRC, South Africa and Tanzania). Using a sustainability indicators' framework, a Sustainable Development Index (SDI) for the countries is developed in relation to mining. The aim is an attempt to quantify SD, draw practical inference on how the concept has been implemented and the challenges in achieving the balancing act within SD systems. Some of the recommendations made in Chapter Three on developing specific indicators to track SD progress for mining are achieved in this Chapter. However, it concludes on the need to understand optimal mineral development for RRA countries. The Chapter is structured as follows: the first part presents the criteria and selection of countries for the assessment; the second, discusses the process for the selection of indicators for the sustainability framework coupled with the methodology for measuring SD; the final part discusses the SD performance in the four countries and the lessons learnt from the assessment.

4.2 Selection of Countries for Quantifying Sustainable Development

The section traces the criteria used in selecting the countries. The goal of the criteria was to identify four gold producing countries, three leading and a bad practice mineral regime in Africa. As established earlier on, the focus of the selection is resource-rich *'dependent'* and *'significant'* countries in SSA. This is defined in terms of actual reliance of 25% or more of fiscal mining revenues to output, excluding grants, and mineral exports to total exports (Lundgren *et al.,* 2013). This qualification was used to

identify the initial set of countries for consideration in the selection. Annex 1.1 provides the justification for the classification.

Here, also, the Fraser Institute's (FI) 2015 set of RRA countries, which included new entrants such as Eritrea, Ethiopia, Kenya and Madagascar, and resource significant countries like South Africa were included (Jackson and Green, 2015). Thus, the initial pool of mineral-rich, SSA countries for the assessment was 22.

The criteria for the selection of countries were as follows:

- Criterion one used the FI's Survey of *Best Practices- Mineral Potential Index and Current Mineral Potential Index* to plot best to good practice regimes. Here, the mid-points of these indexes were used to create a quadrant consisting of a 2-tier system of best to good/ worst practice regimes in SSA.
- The second criterion used gold production quantities (above 10,000 kilograms) to further filter the selection of countries.
- Criteria three and four were based on social, environmental and economic indicators relevant to mineral economies to further filter countries in the selection process. In criterion three, social and environmental indicators, which comprised of the Human Development Index (HDI) and the Environmental Performance Index (EPI) by the UN and the Yale Center for Environmental Law and Policy (YCELP) were used. The fourth criterion was on economic diversification. Here, a simple economic indicator, i.e. gross fixed capital formation was the proxy due to challenges in identifying a standardized diversification indicator for the selection.[40] A simple rank-sum method was applied to the three indicators to determine weights that would assist in ranking countries for further selection.
- The final criterion used the percentile scores of the Worldwide Governance Indicators (WGI) developed by the World Bank and Natural Resource Governance Institute (NRGI) for the final selection of countries.

[40] Usually, the Herfindahl-Hirschman (HH) index is used but because the HH has not been calculated for all countries, the gross fixed capital formation was used as the proxy.

4.2.1 Criterion One: Mineral Potential- Best vs. Current Practices

In applying criterion 1, the point of departure was to plot mineral potential (best practice versus current practice) from the FI's assessment. Here, (18) SSA countries out of the 22 RRA countries were selected from the pool. This was to aid in identifying the pure mineral potential of each jurisdiction. From this plot, two-tier sets of countries are defined. Tier 'one' is a set of countries found within the upper right quadrant of *Figure 4.1*. These represent (best to good) countries beyond the mid-point of 0.40 and 0.35 of the two indexes. Tier 'two' are (good to worst regimes) found in the lower-right quadrant of *Figure. 4.1.* This was defined by the researcher as representing the mean threshold for both indices.

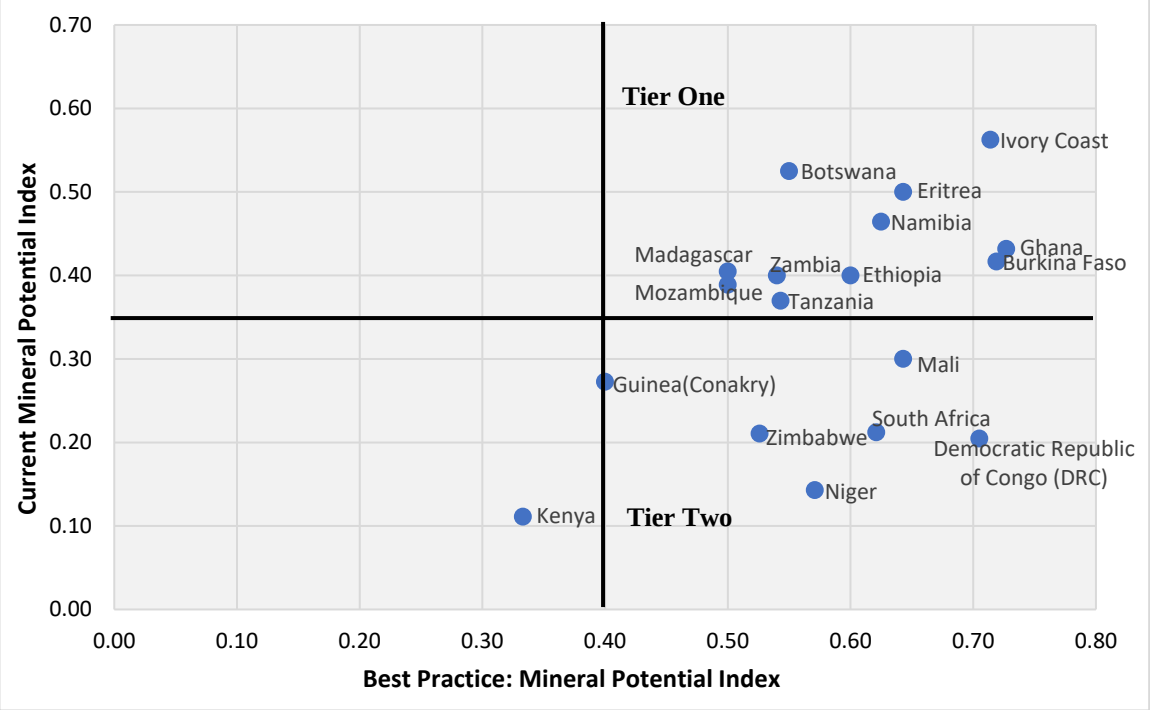


Figure 4.1: Mineral Potential- Best Practice vs. Current Practice

Source: Jackson and Green (2015)- Fraser Institute data (2014/2015)

From *Figure 4.1*, the list of countries from the FI's assessment and the two-tier sets of mineral-rich countries are illustrated in *Table 4.1*.

Table 4.1: First Selection- Resource-rich Countries and the Tier System

18 Countries (Initial set of countries before plotting in fig. 4.1)		17 Countries (After the plotting) Best Practice vs. Current Practice	
		Tier One	Tier Two
Botswana	Mozambique	Botswana	DRC
Burkina Faso	Namibia	Burkina Faso	Guinea (Conakry)
DRC	Niger	Eritrea	Mali
Eritrea	South Africa	Ethiopia	Niger
Ethiopia	Tanzania	Ghana	South Africa
Ghana	Zambia	Ivory Coast	Zimbabwe
Guinea(Conakry)	Zimbabwe	Madagascar	
Ivory Coast		Mozambique	
Kenya		Namibia	
Madagascar		Tanzania	
Mali		Zambia	

Source: Jackson and Green (2015)- Fraser Institute (FI) data (2014/2015)

From plotting the 18 countries on the graph in *Figure 4.1*, 17 countries were further selected (see the blue and green highlighted countries in *Table 4.1*).

4.2.2 Second Selection of Countries

Of the 17 identified countries in *Table 4.1*, 10 gold producing countries (5 in each Tier) are further selected using the world gold production data from United States Geological Survey- USGS (2015) (Annex 4.1 presents the results). The cut-off for inclusion in the selection was above 10,000 kilograms of gold production. After applying this criterion, the countries filtered to the next stage were: Tier 1- (Burkina Faso, Ivory Coast, Ghana, Tanzania and Ethiopia) and from Tier 2- (DRC, Guinea, Mali, South Africa and Zimbabwe).

4.2.3 Applying the Third and Fourth Criteria

Criteria 3 and 4 represented concerns (i.e., economic, environment, and social) central to mineral economies. To apply the criteria, the *rank-sum* method is used to aid in the ranking and weighing of countries on the three indicators- (HDI, EPI and gross fixed

capital formation). The rank-sum method gives pre-determined weights to each indicator. *Table 4.2* shows the ranking procedure in determining the weights.

Table 4.2: A Simple Rank Sum Procedure for Weighting

Criteria 3 and 4	Straight Rank	Rank Sum Method (t) $\sum_{i=1}^{5} t$	(Normalised) New rank/$\sum_{i=1}^{5} t$
Economic diversification	3	1	0.1667
Human Development Index (HDI)	1	3	0.5000
Environmental Performance Index	2	2	0.3333
		6	1

Source: Researcher's Analysis (2016)

In the rank-sum method, each criterion is weighed based on the level of importance of the assessor, with a final cumulative weight determined by each rank over the total sum of the rank. This is done from (1) - highest importance, (2) high importance and (3) important.[41] The aim of applying the weights was to rank and select best to worst practice regimes in Africa. Six countries were finally selected out of the 10 countries (see *Table 4.3*).

[41] The HDI is ranked (1) highest importance because of its measure of the state of poverty and income of a country, followed by the EPI (2) high importance, and (3) important for economic diversification.

Table 4.3: A Matrix of the Rankings and the Final Selection of RRA Countries

Gold producing Countries	Criteria 3: Social and Environmental Indicators						Criteria 4: Economic Diversification Indicator			ALL			
	HDI (2015)	Rank	Weighted Score (0.5)	Environmental Performance Index (2014)	Rank	Weighted Score (0.3333)	Gross Fixed Capital Formation (current US$) (2015)	Rank	Weighted Score (0.1667)	Total Avg. Weighted Score	Rank		Selected Countries considered for final selection
TIER ONE COUNTRIES													
Burkina Faso	0.402	10	5	40.52	4	**1.333**	3379617287	7	**1.167**	2.500	7th		**Ghana (2nd)**
Ghana	0.579	2	1	32.07	7	**2.333**	8941182455	4	**0.667**	1.333	2nd		**Tanzania (3rd)**
Ethiopia	0.442	6	3	39.43	5	**1.667**	24178835094	1	**0.167**	1.611	6th		**Ivory Coast (5th)**
Ivory Coast	0.462	5	2.5	47.6	3	**1.000**	6390531738	5	**0.834**	1.444	5th		
Tanzania	0.521	3	1.5	36.19	6	**2.000**	15740268486	3	**0.500**	1.333	3rd		
TIER TWO COUNTRIES													
Democratic Republic of Congo (DRC)	0.433	7	3.5	25.01	9	**3.000**	5689970227	6	**1.000**	2.500	8th		**South Africa (1st)**
Guinea (Conakry)	0.411	9	4.5	28.03	8	**2.666**	884788621.2	10	**1.667**	2.944	10th		**Zimbabwe (4th)**
Mali	0.419	8	4	18.43	10	**3.333**	2185484679	8	**1.334**	2.889	9th		**DRC (8th)**
South Africa	0.666	1	0.5	53.51	1	**0.333**	64761539004	2	**0.333**	0.389	1st		
Zimbabwe	0.509	4	2	49.54	2	**0.667**	1995427000	9	**1.500**	1.389	4th		

Sources: Researcher's Data Analysis (2016); Data from: (UNDP, 2016; YCELP, 2014; World Bank, 2015)

Table Interpretation: The weights determined in *Table 4.2*, i.e. (HDI- 0.5, EPI- 0.333 and economic diversification- 0.1667) are applied to columns 4, 7 and 10 respectively. The rank obtained by each country based on their scores on the indicators is multiplied with the weight to obtain the weighted score. Column 11 averages the weighted scores for the three indicators- HDI, EPI and economic diversification for the final rank of countries. The countries are finally ranked based on their final scores with the best three countries in each tier (in the final column) progressing to the final selection.

4.2.4 Final Selection of Resource-Rich African Countries

The six countries selected from *Table 4.3* are presented in *Table 4.4*. These are the three best performing countries in Tiers 1 and 2.

Table 4.4: Gold Producing Countries that Qualified for the final Selection

First Tier	Second Tier
Ghana (2nd)	South Africa (1st)
Tanzania (3rd)	Zimbabwe (4th)
Ivory Coast (5th)	Democratic Republic of Congo (8th)

Source: Researcher's Data Analysis (2016)

The final criterion used the worldwide governance indicators (WGI) to decide on two countries within each of the Tiers for the assessment (see *Table 4.5* for the scores). In Tier 1, Ghana and Tanzania qualified for the final selection due to average percentile scores of (54.6) and (34.7) on the WGI's percentile rank for 2015.

Table 4.5: WGIs' Percentile Scores for the Final Selection of Countries

First Tier	Second Tier
Ghana (54.6)	South Africa (58.9)
Tanzania (34.7)	Zimbabwe (11.6)
Ivory Coast (31.1)	Democratic Republic of Congo (6.5)

Sources: Data from: World Bank- WGI (2015)

South Africa and the DRC are selected in Tier 2 because South Africa's score on the WGI is the highest amongst the three countries. The DRC's regime scored the lowest on the governance indicators (6.5/100) out of the three countries in Tier 2. Considering that the DRC has one of the lowest GDP per capita (US $384.51) based on 2015 estimates by the World Bank and the need to consider worst practice jurisdictions, it is selected over Zimbabwe for the assessment (World Bank, 2015).

All in all, four countries- Ghana and Tanzania (Tier one) and South Africa and the DRC (from Tier two) are selected for the assessment. The next section discusses the

theoretical underpinnings behind how SD was measured, the selection of indicators for the assessment and the mathematics behind the aggregation formula that led to the SDI.

4.3 Theoretical Framework and Methodology for Sustainable Development Assessment

The discussions in Chapter Three (see sections 3.3.1- 3.3.2) alluded to the current interpretations of SD as the balancing components of SD systems by industry. Recently, the MMSD+10 (together with the ICMM's) interpretations has been further premised on the net contributions or benefits of mining to the three systems in fulfilling SD ends.[42] Since, this interpretation of sustainability has been co-opted by industry for mining; the Thesis' theoretical framework for measuring SD is also premised on the balancing components between the economic, natural or environment and social systems within a governance framework (see *Figure 3.1* of Chapter Three). Some of the theoretical discussions to buttress this view of SD are traced from Chapter Three's evolution of SD and conclusions on sustainability in mining.

Due to the multi-dimensional nature of the systems of SD as was earlier asserted, the indicators framework for assessing sustainability has been selected to aid in the assessment. In terms of sustainability assessments, there are many keen approaches taken to assess SD such as: pressure-state-response frameworks; indices, and indicators. The indicators' framework approach is selected because of two reasons: (1) the multi-dimensionality of SD and (2) quantifying SD from an aggregate or composite perspective requires a method such as an indicators' framework. This is to assist in measuring the process and outcome indicators of mining's sustainability.

[42] Within this purview, policy and research studies have pointed to the crust of SD as encircling the pillars of social, environmental and economic systems in the context of well-functioning institutions and governance (Barbier, 1987; Munasinghe, 1992; United Nations, 1995).

A framework of national sustainability indicators covering the systems within SD is developed to assist in the measuring of SD in the selected four gold mining countries.

The next section discusses the measurement process and the indicators, which were finally selected for measuring SD progress in gold mining economies.

4.3.1 Selection of Sustainable Development Indicators

The process for the selection of the indicators was based on a global and regional scan of SD and mining issues of relevance to Africa. The chart (*Figure 4.2: An Assessment Map for the Selection of SD Indicators*) was used to trace how the final indicators to measure sustainability were selected.

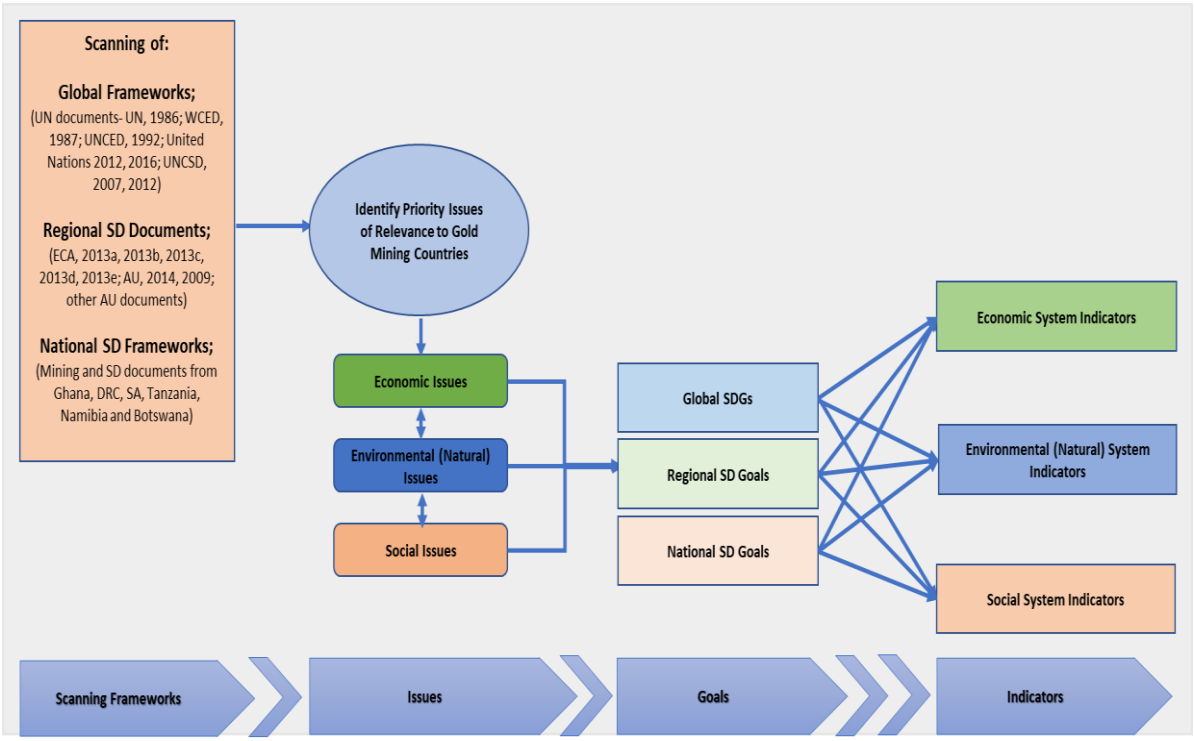


Figure 4.2: An Assessment Map for the Selection of SD Indicators

Sources: Method adapted from (UNCSD, 2007, 2012; United Nations, 2005; Pintér *et al.*, 2005; ECA, 2012)

Based on the chart (see *Figure 4.2*), the steps for the selection were as follows:

- Scan global, regional and national documents;

- Identify priority issues within the geographic reach of global, regional and national;
- Codify the priority issues, while identifying regional SD goals; and
- Based on the issues and goals, identify the most relevant indicators at the national level to measure SD.

From the scan, relevant global issues of concern and current SD and mining issues faced by mineral economies are illustrated in *Figure 4.3*. The list is coded as Global (Economic, Environmental and Social) and National (Economic, Environmental and Social) issues - (GEC, GE, GS and NEC, NS and NE) respectively.

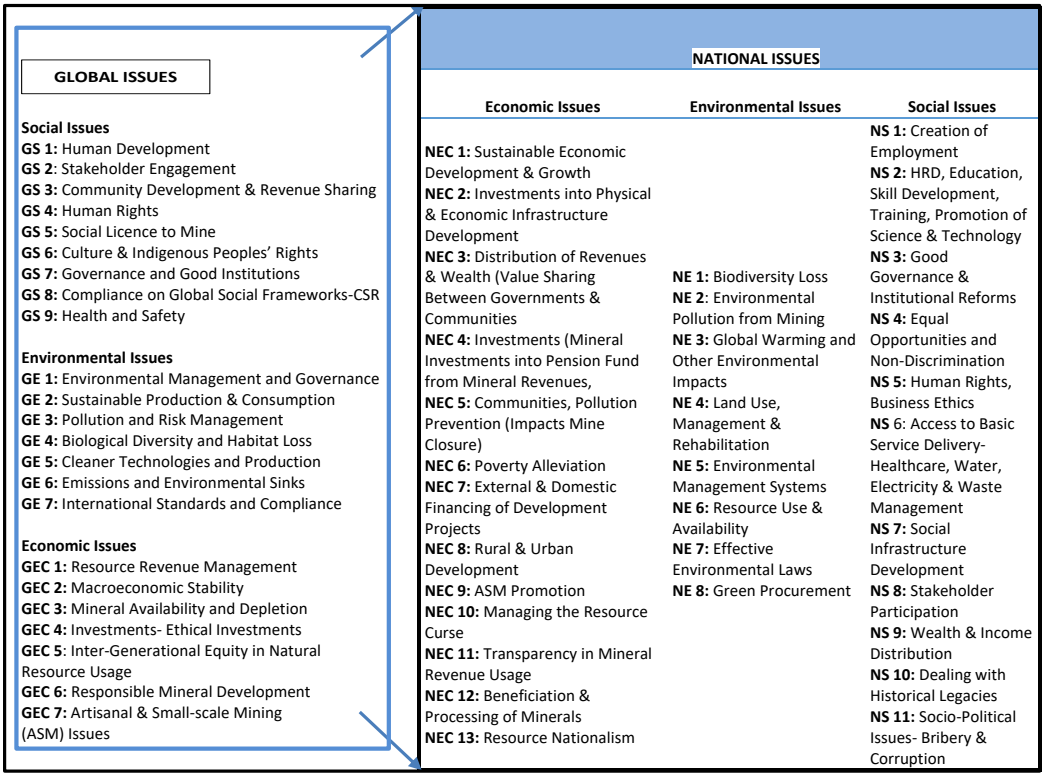


Figure 4.3: Global-National Priority Issues of Relevance to RRA Economies

Sources: United Nations (2015c); ECA-AU-AfDB (2012); ECA (2013a, 2013b, 2013c, 2013d); Buxton (2012); Azapagic and Perdan (2000); Republic of South Africa-DME (2009); Akabzaa (2009); Magai and Márquez-Velázquez (2011)

4.3.2 Matrix of Sustainable Development Indicators at the National Level

From the priority issues (in *Figure 4.3*), 23 core indicators, which comprised of (8) economic indicators, (7) environmental indicators, and (8) social indicators were

further defined. *Table 4.6* gives an overview of the core indicators in each of the systems for national sustainability. The regional SD goals tabled through a lengthy scan of the challenges and issues facing the continent by the ECA have been co-opted into the indicators' framework (see ECA 2013a, 2013b, 2013c, 2013d). The Global SDGs were not used because the proposed regional SD Goals reflect the regional view of what the continent wants to achieve.

Table 4.6: Sustainable Development Indicators at the National Level

CORE INDICATOR	GLOBAL-REGIONAL-NATIONAL ISSUES	REFERENCES	SD GOALS (African Region)
ECONOMIC SYSTEM (E)			
E 1: Macroeconomic Stability	**GEC 2; NEC 1:** Growth policies- Fiscal, Taxation, Investments; FDIs; GDP; General accounts.	Collier (2011); IMF (2012a); Okonjo-Iweala (2010); WEF (2013, 2011); World Bank (1992)	**GOALS 1 & 2**
E 2: Investments into Capital Development	GEC 4; NEC 2, 5, 6: SD Concerns (mainly investments into any social project is considered as economic spending hence captured in this section)- Economic development, poverty alleviation; Investments Into development projects- road and railway systems public works; Capital Infrastructure Development; Employment creation; Social investments into communities; Social infrastructure; Research and development; Science, Technology and Innovation Policies; Cleaner technologies and production.	Söderholm and Svahn (2015); WEF (2013); ICMM (2014, 2012a); Humphreys (2001); Hilson and Murck (2000)	
E 3: Resource Nationalism (RN) Issues	**GEC 1; NEC 13:** Considers mining industry players' view of government approaches to RN issues such as: uncertainty over environmental regulations, regulatory duplications, legal systems and tax regimes; Other issues include: mandated beneficiation, greater shares in LSM, increasing taxation (royalties, corporate taxes, state ownership, and nationalisation of mines.	AU (2009); ECA-AU (2011); Matshediso (2005); Ward (2016)	**GOAL 8**
E 4: Mining Sector Linkages	**GEC 1; NEC 12:** Policy coherence of mineral policy framework with other sector policies; Local beneficiation policy; Procurement and local Supply chain.	Solderholm and Svahn (2014); Dougherty (2011)	
E 5: Transparency and Management of Revenues	**GEC 5, 6; NEC 3, 4, 10, 11:** Public revenue management; Transparency in the use of mineral rents; Equitable distribution of revenues and wealth (benefit sharing) with communities.	Solderholm and Svahn (2014); AU (2009)	**GOAL 9**
E 6: ASM (Economic) Issues	**GEC 7; NEC 9:** Incoming revenues from ASM; Legal provisions for ASM.	Buxton (2012); Hentschel *et al.* (2003); Hilson (2009, 2003); Hoadley and Limpitlaw (2004)	
E 7: Sustainable Production	**GEC 3:** Sustainable production and consumption of natural resources.	Azapagic (2008); Hamilton and Ley (2010)	
E 8: Trade and Investment	**GEC 4; NEC 1:** Intra-regional trade with other African countries and trade with developed countries; Investments into mineral development funds; Equity markets; Sovereign Wealth Funds.	IMF (2012a); Arreaza *et al.* (2009); ECA-AU (2011)	**GOAL 12**
NATURAL/ ENVIRONMENTAL SYSTEM (N)			
N 1: Effective Environmental Regulations	**GE 1; NE 1, 2, 7:** Nuisance, air and water quality; Land degradation, biodiversity, etc.; Laws and acts supporting environmental protection.	Atkinson *et al.* (1997); Sinkala (2009); Republic of South Africa-DME (2009); UNCSD (2007)	**GOAL 8**
N 2: Environmental Quality	**GEC 3, 6; NE 1, 2, 3, 4:** Energy usage and emissions- GHGs, CO2; water, air and land pollution; Wastes- liquid effluents and leachates; Acid mine drainage; Biodiversity and habitat loss; **GE 7; NE 4:** Performance on environmental sustainability issues.	Hsu and Hu (20080; UNCED (1992); ECA (2013a, b, c, d, e); WSSD (2002)	

N 3: Sustainable Natural Resource Management	**GE 1; NE 4, 5:** Water - use, security of supply and recycling; Protection of the natural system- forest reserves and land; Land use; Environmental management and monitoring systems.	ICMM (2010, 2012b); Azapagic (2004); Daily and Huang (2001); Azapagic and Perdan (2000)	**GOAL 10**
N 4: Mine Closure	**GE 1; NE 4, 5**: Environmental management and monitoring systems- post-mine rehabilitation and strategic planning for mine closure.	Azapagic (2004); Azapagic and Perdan (2000)	
N 5: ASM (Environmental) Issues	**GE 3; NE 3:** ASM Pollution- Mercury; Degradation; Regulations and management.	Tschakert and Singha (2007); Valdivia and Ugaya (2011)	
N 6: Knowledge of Mineral Reserves and Resources	**GEC 1; NE 6:** Knowledge of available mineral reserves; Horizon- effective time span until exhaustion.	AU (2009); USGS (2012)	**GOAL 11**
N 7: Compliance on Global and Regional Environmental Sustainability Frameworks	**GE 7; NE 7:** International standards and compliance on global environmental frameworks.	UNCED (1992); WSSD (2002)	
SOCIAL SYSTEM (S)			
S 1: Governance	**GS 7; NS 3:** Institutional quality; Peace and security; Voice and accountability.	AU (2009); ECA-AU-AfDB (2012); Ibrahim Index on African Governance (IIAG) (2016)	
S 2: Quality of Life	**GS 1; NS 2, 6:** Standard of living; Welfare; Human development- income, health, quality of education; Job security and labour entitlements; HRD- education, training and skills development; Income security; Job satisfaction.	Probst (2003); Sen (1999); UNDP (2016)	**GOALS 1 & 2**
S 3: Gender Equality and Empowerment	**GS 4; NS 4, 5:** Women's empowerment, equity in terms of access to resources- income, wealth and healthcare delivery services and social and political participation in all aspects of family, society and national governments.	ECA (2011a); Whitehead (2003)	**GOAL 3**
S 4: Human Rights Concerns	**GS 4; NS 4, 5:** Equal opportunity and non-discrimination; Social inclusion; Equality; Participation; Legal frameworks backing employee and workers' rights.	Sen (1999); UNDP (2016)	
S 5: Legal Provisions for Corporate Social Responsibility (CSR)	**GS 8:** Legal obligations set by the State for companies; CSR Institutionalised in legal frameworks.	Campbell (2012); ECA-AU (2011); Hilson, (2012)	**GOAL 4**
S 6: Local Content Legislations	**GS 9; NS 1, 9, 10:** Job provision; Labour quotas for locals in employment; Procurement and enterprise development; Measures to deal with historical legacies; Health and safety.	Hilson (2012); Klueh *et al.* (2007); Ramdoo (2016)	**GOAL 5**
S 7: Social Cohesion and Socio-economic Development	**GS 2, 3, 4; NS 7, 8, 11:** Community development and local government relations; Preservation of culture and indigenous peoples' rights; Social Licence to Mine.	McPhail (2009); Hilson and Murck (2000); ICMM (2014)	**GOAL 6**
S 8: Compliance on Global Voluntary Social Initiatives and Frameworks	**GS 8:** Ratifications of UN multilateral treaties, conventions, frameworks and strategies.	WSSD (2002); UNCSD (2012)	**GOAL 7**

Source: Researcher's Assessment (2016); References included in the Table

From *Table 4.6*, a number of SD issues pertaining to the sustainability of the business environment was also drawn from Azapagic (2004); Azapagic and Perdan (2000) for the minerals and metals sector. Annexes 4.2- 4.5 provide detailed information on the indicators, definitions for the SD metrics and elements used for the assessment. The full list of the regional SD goals in *Table 4.6* is further illustrated in Annex 4.6.

4.3.3 Measuring Sustainable Development

Measuring SD is arduous due to the complex and multi-dimensional nature of the concept. However, using the indicators' framework for assessment provides a better means for quantification. Often, many indices (such as the EPI and the RGI) use the arithmetic mean to aggregate the components of a concept. Likewise, for the mix of quantitative and qualitative SD indicators (see *Table 4.6*), the arithmetic mean formula is applied. *Figure 4.4* visually highlights the rationale behind the SD measurement.

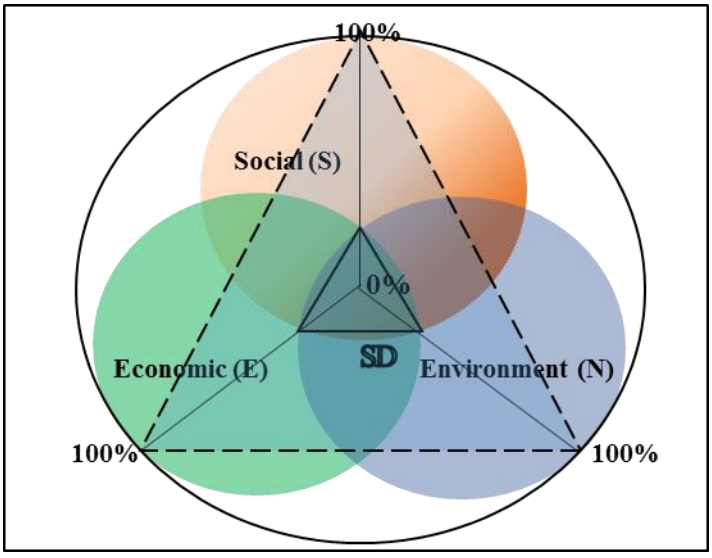


Figure 4.4: A Graphical Illustration of the SD Model

Source: Researcher's Adaptation from Munasinghe (1992); IIED- MMSD (2002)

From *Figure 4.4*, the measurement approach combines the three systems' indicators by assuming equal weightings for each system of SD (at 100% per each system). The larger triangle represents the optimal balanced point- this commences from the centre

at (0%) to the end of the vertices (at 100%). It further assumes that, if countries are close to all three elements (at 100%), this then implies the 'goodness' of the SD situation in a country. The scale of (100%) for national sustainability is purely for the measurement process. The (23) SD indicators identified (in section 4.3.2) are ranked in terms of the *'process'* indicators in some cases, together with the scores of other relevant indexes, which are put on the same scale then aggregated using the arithmetic mean formula. The mean formula for the SD indicators for each of the three systems- Economic System (E), Environmental/Natural System (N) and the Social System (S), representing individual (*x*) values is expressed as:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} \quad \text{.....(1)}$$

In terms of the normalisation technique, ordinal rankings and the min-max method are applied to some of the indicators. The min-max formula is expressed mathematically as:

$$\frac{x_i - x_{min}}{x_{max} - x_{min}} \quad \text{.....(2)}$$

Where (*x*) represents the indicator value to be transformed. The assessment also relied heavily on ordinal rankings, particularly 'toggle-switch' questions, such as: (Yes- 1 and No- 0); and (Ratified and signed- 1, signed 0.5 and not signed 0). To ensure that all indicators are on the same scale, process and outcome indicators were scaled to 100 before the mean values for each system were derived.[43]

[43] As a caveat, composite indicators and index require many methods. In each case, the method selected is at the discretion of the evaluator. Because in the case of SD, several indexes exist within the various dimensions, some of these are pooled together. Thus, the thesis proposes the concept of super indexes, which draws on other indexes to inform an integrated index. A benefit of this, is ensuring that different instruments within SD speak to one another, minimal use of resources and engaging different agencies to work together to achieving a common and integrated index for SD.

For ease of assessment of SD, the arithmetic mean obtained for the national systems for (n) values, satisfying $0 \leq n \leq 100$ for national sustainability is further simplified on a rating scale for the assessment (in *Table 4.7*).

Table 4.7: Rating Scale for Sustainable Development

Score	Rank
0 – 30	Bad
30 ≥ 50	Poor
50 ≥ 70	Average
70 ≥ 90	Good
90 ≥ 100	Excellent

Source: Researcher's Data Analysis (2016)

The rationale for the rating scale was to aid the assessment and discussions of the SD quantification in the four countries.

4.3.4 Data and Measurement Sources

The base years for the SD measurement of the gold mining countries were (2014-2015); additionally, where data was not available for those years, the latest available data was considered. Relevant global indexes were utilized especially in certain instances where data for national measurements were unavailable. Risk factors, such as political, economic, social and environment were inherent in some of the indexes, and thus were part of the assessment. The definitions of the quantitative and qualitative indexes used in some cases for the assessment are presented in Annexes 4.3- 4.5.

Furthermore, because the indicators drew on a pool of other global measures and indexes, the aggregated SDI is a mix of qualitative and quantitative measurements. Some of the qualitative (or *process)* indicators were assessed based on the effectiveness of the mining laws, policies and strategies that have been implemented by each country. This consisted of assessing the existence and effectiveness of fiscal frameworks, taxation, investments, local content laws, environmental legislations and

CSR strategies with a list of probing questions that is ranked out of a 100% using a series of toggle-switch questions.

4.4 Overview of the Mining Sectors of the Selected Countries

Before the SD assessment and discussions, the state of mining in the four countries is presented. The rationale of this brief is to show the state of general mining and SD frameworks which exist in the four mining regimes. This will enhance a further understanding of the index for the four countries in section 4.6. *Figure 4.5* graphically illustrates the geographic positioning of each of the selected countries on a regional map of Africa.

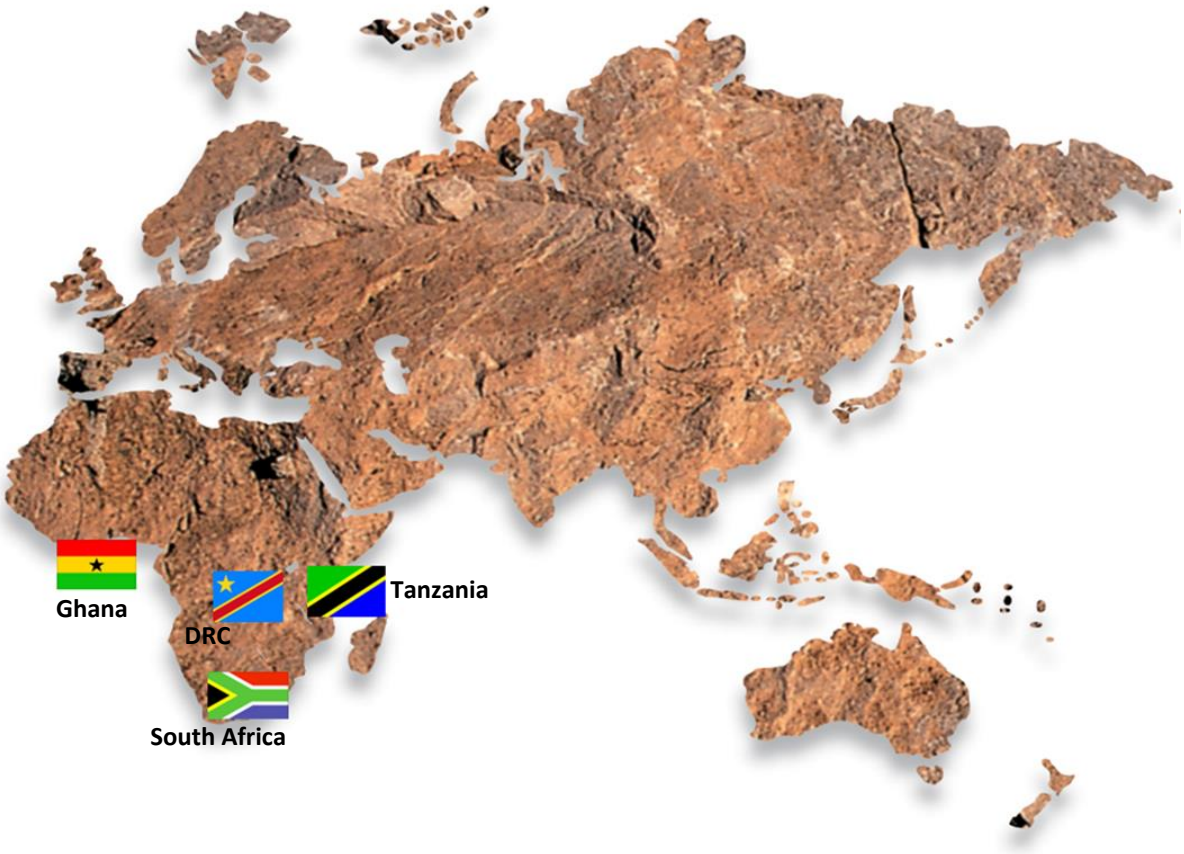


Figure 4.5: A Map Showing the Case Study Countries in Africa

Source: GIS Map developed by the Witwatersrand Mining Institute- WMI (2017)

4.4.1 Ghana

Ghana is the second largest producer of gold in Africa (producing about 107 and 85 tonnes in 2014/15) (Minerals Commission, 2015). In 2011, it had one of the highest growth rates in the world of 15 per cent, second to Botswana and China (of which non-oil contributions to GDP was 8%). Gold remains the highest contributor to the entire mining sector (of about 90%) to total mineral exports (The Ghana Chamber of Mines, 2016). Its services and industrial sectors are the highest contributors to GDP of 28% and 49.6% respectively (in 2014), while its agricultural and mining sectors declined in percentage share to 22% and 3.5% respectively to GDP in 2015 (Ibid).

Ghana's liberalisation reforms led to the promulgation of a new mining law called the Provisional National Defence Law (PNDCL) 153 (after the 1962 Act, 126) in 1986. The aim of the Law was to open the economy to new mining investments. The second phase of Ghana's mining laws from the 1990s emphasised environmental protection and served as an addendum to PNDCL 153. Because commitments from the *Rio Declaration* were in force, environmental sustainability became a key part of gold mining's sustainability in Ghana (Akabzaa, 2009).

By 2006, the Minerals Amendment Act to the PNDCL 153 was repealed, to make way for a new paradigm under one mining law - the Minerals and Mining Act of 2006, Act 703. This Act according to Bloch and Owusu (2011) set the tone for a new mining regime in Ghana. The Act covers all aspects of mining, fiscal regulation, security of tenure, licences, community upliftment, small scale mining, while working with other auxiliary laws, such as the Environmental Protection Act, Act 490, Legislative Instruments (LIs) 2173- 2177 and 2182 on local content; fiscal laws, the Mineral Development Fund (MDF), Act 912, and the 1992 Constitution of Ghana.

4.4.2 Democratic Republic of Congo (DRC)

The DRC economy grew at a rate of 7.7% in 2015 and 9.2% in 2014, making it one of the fastest growing countries in the world (AfDB, 2017). The recent growth can be attributed to its mining sector, of which, the country is the largest producer of cobalt globally (about 55% in relation to global output), and the second largest producer of industrial diamonds. It has significant high-grade copper ores, and has the tenth largest reserves of gold (KPMG, 2014b: *Profile on DRC*). Growth in real terms has been as a result of its extractives and manufacturing, agricultural and services' sectors of about 32.9%, 20.4% and 46% (from 2015 estimates) respectively (AfDB, 2017).

Gold remains a key part of DRC's extractive sector, with a 30% increase in gold production in 2015. With new private investments coming into the sector (by Randgold Resources & AngloGold Ashanti), gold has been touted as a key area for FDIs into the DRC (Chamber of Mines- DRC, 2015). The mining industry generates about 64% of the entire government revenues per the Extractive Industries Transparency Initiative (EITI) report of 2014 (Republique Democratique Du Congo- ITIE, 2015). Revenue in taxes from the mining industry in 2014 was US$1.348 billion paid by mining companies out of US$1.770-billion. The industry also provides indirect and direct employment to over 55 000 people of which there are multipliers of a job to four additional jobs (Chamber of Mines- DRC, 2016, 2015).

The DRC passed its Mining Code (Law no. 007/2002) to govern the regulation of minerals exploitation and mining in 2002. The code covers all types of high value to low value minerals, metals and ores. Despite achieving a modicum of transparency in revenue management, the country has yet to benefit from its mineral revenues (see Republique Democratique Du Congo- ITIE, 2015). The government's response to the limitation of the 2002 code is to propose increasing the free stake of 5% to 15% in new mining projects, increasing income tax from 30% to 35%, royalties on copper and

cobalt to 6%, and slicing stability agreement review from 10 years to 5 years (Radley, 2017). DRC's gold mining also consists of a large segment of artisanal gold producers mining illegally in the East Kivu Province. Government statistics points to over 90% of mineral revenues from the illegal/ legal ASM gold exploiters in the sector (ECA, 2016c).

4.4.3 South Africa

As the lead gold producer in Africa of (about 152 tonnes in 2015), gold constitutes 11% of total mining to GDP in 2015, together with coal (23%), Platinum Group Metals (22%), mining and quarry (13%) and other metals at (31%) (Chamber of Mines- South Africa, 2016, 2015). The mining sector coupled with manufacturing enabled the current rise of 3.3% in GDP in 2016. Although mining only makes up 7.7% of GDP in South Africa, its direct contribution is immense, of about (17%) to the economy; 10.8% and 17% in total fixed and private sector investments respectively (Chamber of Mines- South Africa, 2016).

The impact of falling gold prices has had significant effects and led to a gradual decline of South Africa's gold industry post-2008. Some of these effects have resulted in unsteady and volatile nature of gold operations. 'This is gold' (2015) postulates that between 2001 and 2014 the total amount of tonnes milled reduced by 7% and resulted in a 61% decrease in production. However, the multipliers to the South African economy are very significant with the gold sector supporting between (5- 10) dependants for every direct mining job created (Chamber of Mines- South Africa, 2015; "thisisgold," 2015a).

South Africa's mining code, the Minerals and Petroleum Resources and Development Act (MPRDA), Act 28 of 2002 repositioned the sector for international competitiveness after 2002. The goal of the MPRDA is to provide equitable access to

and the SD of South Africa's mineral and petroleum resources for the needs of society. Article (2) situates the fundamental principle of the Mining Law with sub sections 2 (h) and (i) framing South Africa's SD strategy around the development of minerals and petroleum for socio-economic development and within the purview of ecological sustainability (Republic of South Africa, 2002). As a pacesetter, the Broad-Based Black Socio-Economic and Empowerment's (B-BBSEE) Mining Charter of (2004) and it's 2010 amendments under Art. (100) sections (1) and (2) of the MPRDA has laid the foundation for a local content strategy for sustainable and equitable access of its minerals for development of South Africa. There has been challenges to implementing the new Charter of 2017. Some of these challenges are noted in Chapter Eight on implementing the Strategy (see Section 8.4.1 of Chapter Eight).

4.4.4 Tanzania

In Tanzania, gold is one of the largest sources of growth to the economy with an annual production of (45- 50) tonnes in the past four years. Minerals exports accounted for about 24% of total value of Tanzania's export in 2015 with gold representing more than 90% of this share (AfDB, n.d.). The country has come a long way of rapid growth from 3.9% in 2013, with key contributions from other sectors including construction (14.1%), financial and insurance (10.8%), information and communication (8.0%), services (7.2%) and manufacturing sector (6.8%) in 2014 (Ibid).

Tanzania's gold mining sector reforms can be traced to the beginning of the economic recovery programme instigated by the IFIs in the 1980s. This led to two things: 1) the unbundling of the monopolised State Mining Company (STAMICO); and 2) the passing of the 1997 Mining Act and 1998 Mining Policy, according to Magai and Márquez-Velázquez (2011). From the mid-1990s, private players entered the gold sector, and this precipitated huge investments by 3 global seniors - AngloGold

Ashanti, Barrick Gold, now Acacia Mining and Placer Dome Inc. in the early 2000s (Ibid).

Tanzania formulated a new Mining Policy in 2009 aimed at strengthening the integration of the mineral sector with other sectors of the economy (refer to The United Republic of Tanzania, 2009). As regulator, the government's fiscal and environmental regime for regulating the sector have been lauded as robust, with its new Mining Act of 2010 enhancing transparency in the mineral rights framework and legitimising the activities of ASM operators. Additionally, Tanzania recently passed a Transparency and Accountability Act in 2015 to ensure availability and transparency of information on government contracts (Mining Development Agreements), revenue collection, spending by governments, data on capital investments into Tanzania, as well as revenues from mining production, exports, imports and fiscal instruments used to tax the minerals sector (see The United Republic of Tanzania, 2015a). The next sections present the four countries' scores on the SDI and lessons learnt on SD implementation in the countries.

4.5 Sustainable Development Applications in Selected Countries

The performances on the SD indicators for the four selected gold mining countries (DRC, Ghana, South Africa and Tanzania) are discussed. These are centred on the scores within the three systems' economic, environment and social concerns in mining. The governance dimensions have been co-opted in some of the systems (as was shown in *Table 4.6*). Before the general discussions, the methodology highlighted above is used in a country example to illustrate how SD within a system was measured.

4.5.1 An Example of the Measurement Using Ghana's Social System

Ghana's scoring process under the social system is illustrated. This country example comprises of scores obtained on the qualitative and quantitative indicators. The arithmetic mean formula is applied to (8) core indicators under the social system to obtain the overall social sustainability score for Ghana. The scores for the indicators are presented below.

The measure for *governance* (S1) was the Worldwide Governance Indicators. See scores in *Table 4.8*.

Table 4.8: S1- World Governance Indicators

Country	**Series Name**	**2015**
Ghana	Control of Corruption: Percentile Rank	53.37
	Government Effectiveness: Percentile Rank	44.71
	Political Stability and Absence of Violence/Terrorism: Percentile Rank	50.00
	Regulatory Quality: Percentile Rank	53.37
	Rule of Law: Percentile Rank	60.58
	Voice and Accountability: Percentile Rank	65.52
	Final Score for S1	**55%**

Source: Annex 4.7

For *quality of life* (S2), the indices for measuring this indicator were the HDI and the Global Peace Index. The scores obtained for Ghana are presented in *Table 4.9*

Table 4.9: S2- Quality of Life

Country	Human Development Index- HDI (2015) (0 - 1)	Scaling	Use in the SDI (scaled to 100)
Ghana	0.579	57.9	57.9
	Global Peace Index- GPI (2015) (1- 5)	Scaling	Use in the SDI (scaled to 100)
	1.84	0.368	(100- 36.8) = 63.2
	Final Scores for S2- Quality of Life		
	HDI	GPI	**Final Scores for S2 (Avg. HDI and GPI)**
	57.9	63.2	**61%**

Source: Annex 4.7

The measure for *gender equality and empowerment* (S3) was the Gender Inequality Index. See scores below.

Table 4.10: S3- Gender Equality and Empowerment			
Country	Gender Inequality Index (0- 1) 2015	Scaling (1-x)	Use in the SDI (scaled to 100)
			Final Scores for S3
Ghana	0.557	0.453	**45%**

Source: Annex 4.7

In terms of *human rights concerns* (S4), the measure for this indicator was civil and political liberties from the Freedom House Indicators. The scores are presented in *Table 4.11*.

Table 4.11: S4- Human Rights Concerns				
Country	Freedom House Indicators (2015)		Freedom Rating (1/7)	Use in the SDI (scaled to 100)
	Civil Liberties	Political Rights		
Ghana	2	1	1.5/7= (0.2143)	**(100- 21.43) = 78.57**
	Final scores for S4			**79%**

Source: Annex 4.7

Corporate Social Responsibility- CSR (S5) and *local content* (S6) indicators assessed the existence of expressed Local Content (LC) and CSR regulations or strategies. It was ranked on (100%- yes, 75%- to greater extent, 50%- average consideration, 25%- to a lesser extent, 0%- no consideration). The scores are presented in *Table 4.12*.

Table 4.12: S5 and S6- Existence of Local Content and CSR Provisions		
S 5.1- CSR Provisions and S 6.1- Local Content Requirements		
Country	S 5.1: Are there legal provisions for CSR in mining codes?	S 6.1: Are there legal provisions for local content in mining codes?
Ghana	**50%**	**100%**

Source: Annex 4.7

S 5.2 and S 6.2 teased key CSR and LC elements for social sustainability. These are as presented in the *Tables 4.13- 4.15*. The legislative instruments whether implied or expressed is ranked based on the elements below. (1 for yes, 0.5 for implied and 0 for not included in the regime's requirements).

Legal provision for *CSR* (S5.2) is presented in *Table 4.13*.

Table 4.13 (A): S5.2- Legal Provisions for CSR

Country	Economic Issues	Beyond environmental sustainability			Social upliftment				Employee issues				
	community and socio-economic development	Reclamation	Re-afforestation	Promotion of Cleaner Technologies	Education	Health	Sports and Youth Development	Cultural Enhancement	HRD- CPD	Provisions for Collective Bargaining	Company and employee Relationships	Job Security	Percentage of total
Ghana	1	1	1	1	1	1	0	0	1	1	1	0	**75**

Source: Annex 4.7

Legal provision for *local content* (S6.2) is presented in *Table 4.14*.

Table 4.14 (B): S6.2- Local Content Policies and Mining Law

	Local Content Provisions											
Country	Building Local Infrastructure	community development	Employment- Job Creation	Community Development Fund	Community Involvement and relationships	Local procurement & Enterprise Development	Technology transfers	Research and development	Training and skills development	Local content plan	Monitoring and evaluation	Percentage of total
Ghana	0	1	1	1	1	1	0	1	1	0	1	**73**

Source: Annex 4.7

The final scores for S5 and S6 are presented in the Table below.

Table 4.15: Final Scores for S5 and S6						
Country	S5: Legal Provisions for CSR			S6: Local Content Legislation		
	Are there legal provisions for CSR in mining codes?	What elements are considered?	**Final Scores for S5**	Are there legal provisions for local content in mining codes?	What elements are considered?	**Final Scores for S6**
Ghana	50	50	**63%**	100	54.5	**87%**

Source: Annex 4.7

The metric for assessing *social cohesion and socio-economic development* (S7) were CPIA's Social Cohesion policy assessment and the African Infrastructure Development Index. The scores are presented in *Table 4.16*. The CPIA was used because of the challenges in obtaining national level data on social cohesion.

Table 4.16: S7- Social Cohesion and Socio-economic Development				
Country	CPIA- Social cohesion (2015)		Africa Infrastructure Development Index (2015)	**Final Scores for S7**
	Scored out of 6	Use in the SDI (Normalised scores)	scored out of 100	
Ghana	3.95	65.83	25.43	**46%**

Source: Annex 4.7

The status and ratification on relevant global human rights, regional human and social rights instruments was the indicator for S8, *compliance on global and regional vol. initiatives*. These were ranked based on the following: signed and ratified (1), not signed (0), signed but not ratified (0.5). The scores are presented in the Table below.

Table 4.17: S8- Compliance on Global and Regional Vol. Initiatives			
Country	Global Human Rights Frameworks	Regional Frameworks- Social and Human Rights	**Final Scores for S8**
Ghana	80.6	100	**90%**

Source: Annex 4.7

Ghana's final scores under the social system are aggregated. The country had an overall score of 66%, which on the rating scale represent *average* social sustainability. This means, there exists room for Ghana to improve and enhance its social concerns in mining. Annexes 4.7, 4.8 and 4.9 illustrate the measurement and scores for the four countries on social, environment and economic systems respectively.

4.5.2 Measuring Sustainable Development in the Four Countries

Taking into account Ghana's example, the final scores for the four countries (from Annexes 4.7- 4.9) are presented in *Table 4.18* and *Figure 4.6*. The aggregated SDI is shown in the last row of *Table 4.18.*

Table 4.18: Sustainable Development Scores for Gold Mining Countries

Core Indicators	Ghana	Dem. R. Congo	South Africa	Tanzania
Economic System				
E 1: Macro-economic Stability	40	54	64	65
E 2: Investments into Capital Development	40	29	39	47
E 3: Resource Nationalism (RN) Issues	69	43	52	62
E 4: Mining Sector Linkages	31	28	84	31
E 5: Transparency and Management of Public Revenues	63	39	56	50
E 6: Artisanal and Small-scale Mining (Economic Issues)	38	38	56	50
E 7: Sustainable Production	46	0	47	68
E 8: Trade and Investment	41	25	50	40
Average	**46%**	**32%**	**56%**	**52%**
Rating	**Poor**	**Bad**	**Average**	**Average**
	Ghana	**Dem. R. Congo**	**South Africa**	**Tanzania**
Natural/ Environmental System				
N 1: Environmental Regulations	100	100	100	100
N 2: Environmental Quality	32	25	54	36
N 3: Sustainable Natural Resource Management	54	33	79	63
N 4: Mine Closure	42	25	75	46
N 5: ASM Environmental Issues	33	21	42	38
N 6: Knowledge of Mineral Reserves and Resources	38	21	67	42
N 7: Compliance on Global and Regional SD Frameworks	91	91	91	91
Average	**56%**	**45%**	**72%**	**59%**
Rating	**Average**	**Poor**	**Good**	**Average**

	Ghana	Dem. R. Congo	South Africa	Tanzania
Social System				
S1: Governance	55	7	59	35
S2: Quality of Life	61	50	60	57
S3: Gender Equality and Empowerment	45	34	61	46
S4: Human Rights Concerns	79	14	71	57
S5: Legal Provisions for CSR	63	50	75	46
S6: Local Content Legislation	87	31	100	78
S7: Social Cohesion and Socio-economic Development	46	27	66	38
S8: Compliance on Global and Regional Vol. Initiatives	90	76	88	71
Average	**66%**	**36%**	**73%**	**54%**
Rating	**Average**	**Poor**	**Good**	**Poor**
Sustainable Development Index (SDI)	**56%**	**38%**	**67%**	**55%**

Sources: Final scores extracted from Annexes (4.7- 4.9)

Figure 4.6 graphically illustrates the above scores (from *Table 4.18*) on a GIS regional map of Africa. The aim for the figure is to provide a visual presentation of the scores attained by each country on the three systems.

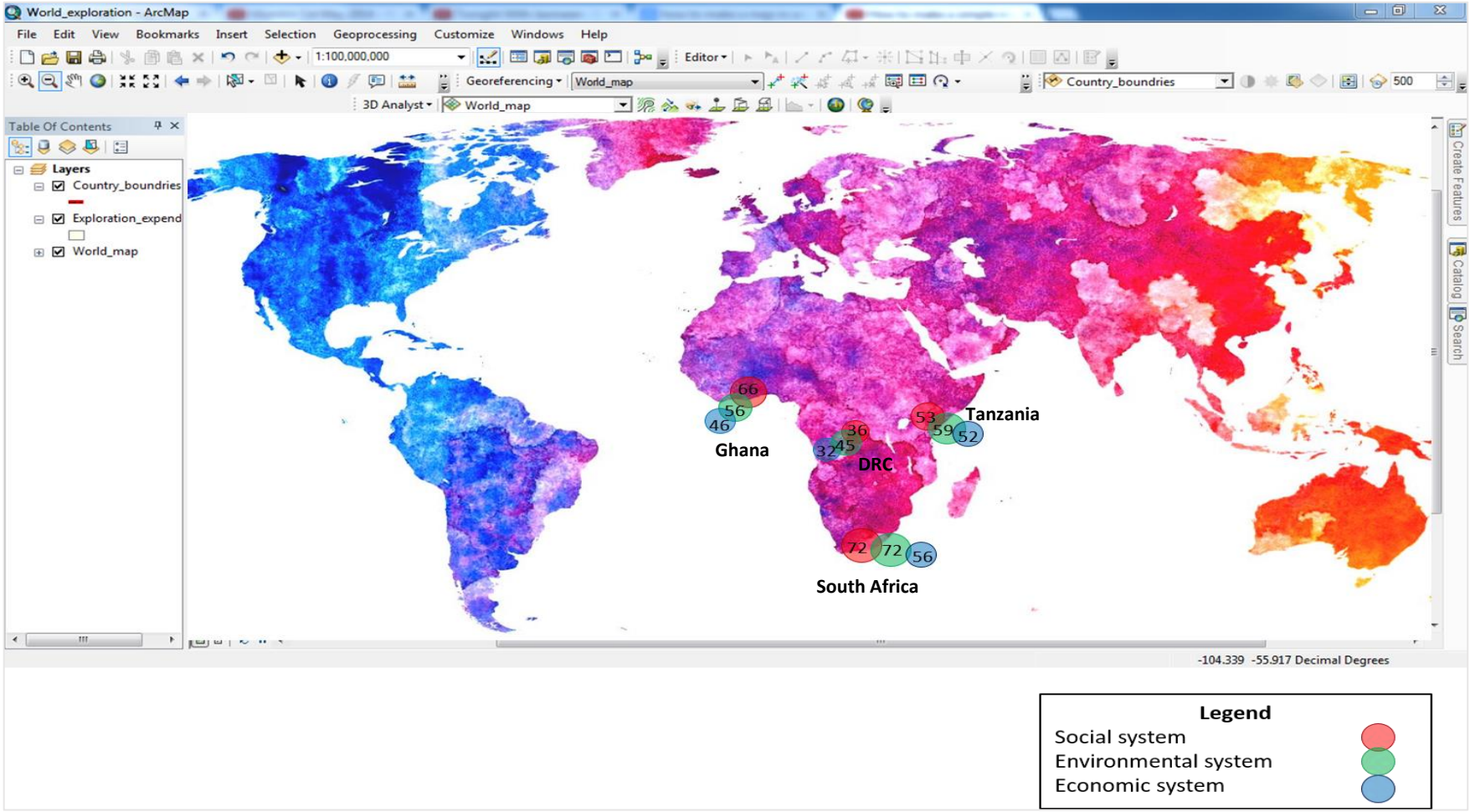


Figure 4.6: Map Showing the SDI Scores for the Four Countries

Source: Researcher's Data Analysis (2016), Map developed by WMI (2017)

The system scores (in *Table 4.18* and *Figure 4.6*) for the four countries are indicated in the table below (*Table 4.19*).

Table 4.19: System Scores for the Four Countries

Core Indicators	Countries			
	Ghana	Dem. R. Congo	South Africa	Tanzania
Economic System	46%	32%	56%	52%
Natural/ Environmental System	56%	45%	72%	59%
Social System	66%	36%	73%	54%

Source: Extracted from *Table 4.18*

From the SD rating, mining countries would have to aim for 70%- 100% to show significant progress in fulfilling SD ends.

Under the economic system, South Africa had the highest score of (56%) although rated *average* (on the SD rating scale) out of the four countries in comparison. This score was similar to Tanzania's score on the economic system. For South Africa, it has a clear-cut SD Strategy for its mining sector, which is pegged on its MPRDA, No.28 and the BBBSEE Mining Charter (refer to section 100 of the Republic of South Africa, 2002; Republic of South Africa-DMR, 2004). However, the current discontentment amongst the labour unions with government and companies, rising xenophobic attacks on foreign nationals (in 2008, 2011 and 2015) and the call for nationalisation of South Africa's mines show weakening linkages of its mining sector with other sectors of the economy (see studies by Neingo and Tholana, 2016). Although, the scores represent a snapshot of the South African economy in 2015, the state of the broader economy has fared poorly in terms of growth from 2015- 2017 as compared to the last decade (see StatsSA, 2018 on annual growth trends for South Africa). Ghana had an overall *poor* economic sustainability score of (46%) but performed averagely on some of the economic indicators. The reason for the averagely

robust scores is because it's MMA 703 is transparent on royalties and other forms of taxes payable by mining companies to government (see Bloch and Owusu, 2011). However, in terms of rent usage, unlike its petroleum management, gold revenues are counted as part of the general fiscus and distributed without a long- term investment strategy to ensure revenue sustainability. On indicator (E8. b) - 'investment funds from gold revenues' for instance, Ghana scored 0% but received a total score of 41% because of its intra-regional trade policies. Although it established the MDF in 2016, its object is for the socio-economic development of mining communities. The strong connections of GDP growth to mineral rents show that a strategic investment strategy for long-term development is of necessity to ensure that citizens benefit from mineral wealth. For the DRC, poor economic sustainability scores depict a weak link of mining's transformative capacity for enhancing development. However, with governments current efforts on transparency (becoming EITI-compliant in 2013), there has been noted improvement in mining revenues' collection and management, although marginally (Radley, n.d.). Overall, with regards to economic sustainability, the DRC performed poorly. This can be attributed to the country's weak social and economic governance and endemic corruption (see scores in *Table 4.18*). Areas with predominant gold mining activities are amongst the poorest in the country with weak infrastructure (refer to studies by Matthysen and Montejano, 2013; Oxford Policy Management, 2013 on gold mining communities in the DRC).

On environmental system, it was revealed that approaches were average towards environmental sustainability. This is due to the lack of technical capacity to frequently monitor mining activities on the environment (see similar conclusions from Sinkala, 2009; ECA, 2009; paragraphs 75- 79). With that said, South Africa's experience with its National Environmental Management Act- NEMA (and its associated acts- water, air quality and bio-diversity) and targets of the BBBSEE Charter have provided a

strong sustainability framework for environmental preservation. Scores on N1, N3, N4, N6 and N7 were good for environmental sustainability. Overall, it had a good environmental sustainability score of 72%. However, some scholars and legal experts (Leon et *al.,* 2017; Ridl and Couzens, 2010; Vermak, 2017) are of the opinion that delays in environmental authorisations procedures due to frequent amendments to the NEMA add on the potential risk for foreign investors in mining. Nevertheless, South Africa's scores on environmental sustainability are a clear indication of an effective framework for ensuring SD ends with industry players. In Ghana's case for example, environmental frameworks and strategies for protection and rehabilitation are present in the regime; however, the lack of technical capacity weakens the impact of such requirements. Therefore, Ghana's score was average at 56% for environmental sustainability. In terms of environmental system, the DRC has instituted regulations at the national level, with ratification on global environmental instruments of relevance to mineral economies. For DRC's environmental regime, there are in existence laws to deal with mining's effects, thus scoring (100%) and (91%) on N1 and N7 respectively. However, on environmental quality where the environmental performance index (EPI) was the proxy, its score was low at 25%. On the other indicators under environmental system, weak governance, and a lack of effective monitoring and evaluation frameworks persist leading to the poor sustainability performance on the index. Tanzania scored fairly on environmental system. The clarity in the country's national regulations and ratification on global environmental frameworks pinpoint to the robust average on its environmental system scores. However, in terms of practical applications, the EPI depicted that environmental quality for Tanzania is poor at 38%. Overall, lack of effective monitoring controls on ASM activities (N5) (similar to Ghana and the DRC) and weak environmental quality affected the total national environmental sustainability score for the country.

On the social system's assessment, Ghana and South Africa had average and good social sustainability scores respectively. Ghana recently instituted provisions for local content, thus scored a high average of 75% for the requirements under Legislative Instruments- LIs (2173- 2177; 2182). However, the country's mining sector is weakly linked with the local economy (ICMM, 2015; Debrah *et al.,* 2013). This was evident from the score on mineral sector linkages, where the economic aspects of local procurement and content for mining were weak at 31%. Also, in the context of national socio-economic development, contributions from mining in the past (8) years have been incrementally impactful (Minerals Commission, 2015). In terms of lessons, Ghana lacks a core integrative SD Strategy or mechanism to build the different mining sector agencies' mandates into a cohesive entity. Ghana can thus learn from South Africa's SD Strategy. South Africa's overall score of 73% can be attributed to the country's excellent scores on local content, scoring 100% provisions for CSR (75%), and global and regional voluntary initiatives (88%), compared with the other three countries. Its BBBSEE charter requirements have effective monitoring and evaluative frameworks to ensure that local content is preserved for the local economy (Republic of South Africa-DMR, 2010). The higher scores on the indicators for the social system is encapsulated in Annex 4.10 which presents the performance of four major gold mining companies in South Africa. In Annex 4.10, gold mining companies are within 80- 100% reach on the BBBSEE targets (this is based on 2015 data) and have made significant contributions to the SD of the mining communities in which they operate. Tanzania's average score of 54% can be attributed to weak governance and socio-economic development and cohesion deficits, thus receiving average sustainability scores of 35% and 38% on S1 and S7 respectively. Although the country's mining law supports local content because there is not an express strategy to transition the requirements of the law, it received a lower score on impacts on the local economy.

The Bomani Report (The United Republic of Tanzania, 2008) recognised Tanzania's challenges with using mineral rents for socio-economic development. Over time, its current development Vision 2025 has also noted the cracks in social cohesion limiting the political will of the nation and government to function effectively (The United Republic of Tanzania, 1999). In terms of the assessment, Tanzania can benefit from addressing coordination challenges with effective guidelines for the SD of the industry (this was noted in The United Republic of Tanzania, 2011 on industrial policies). In mining also, this can be realised by building synergistic relationships between mining sector agencies towards achieving a common goal. In addition, by setting monitoring and evaluation (M & E) frameworks and targets, it can also learn from South Africa's approach. Overall, the DRC had a poor social sustainability score. On social governance, where the World Bank's Governance Indicators were used as the proxy, it scored 7%. The country has significant infrastructure deficits as well as in socio-economic development. It thus scored 27% based on its performance on the African Infrastructure Development Index (AIDI) and the CPIA's social cohesion policy assessment. The lack of expressed M & E frameworks and targets in the mining code and the absence of a LC Strategy[44] to foster socio-economic development have resulted in the weak linkages of the sector with other sectors of the economy.

4.5.3 Sustainable Development Performance for the Four Countries

The above discussions and scores (from *Table 4.18*) are graphed to illustrate the area of sustainability for the four countries in *Figures 4.7* and *4.8*. The red-lined triangle should match the boundaries of the black-lined triangle at the three points of (social,

[44] On CSR under (S 5), its Chamber of Mines has initiated the development of a mining industry guide based on the ISO 26000 reference standard to harmonise the different CSR strategies undertaken by large-scale mining companies.

economic, and natural/ environmental systems) at 100% each. See earlier discussion on the methodology in Section 4.3.3.

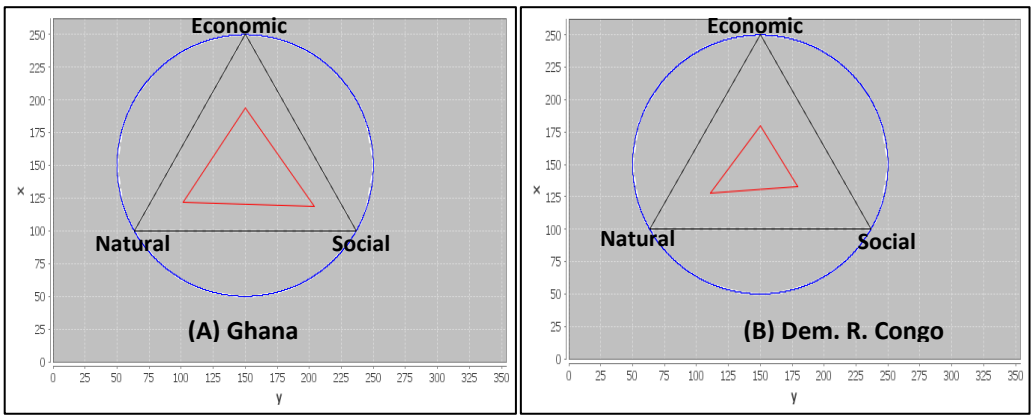


Figure 4.7: National SD Triangles for Ghana and the DRC

Source: Researcher's data analysis (2016)

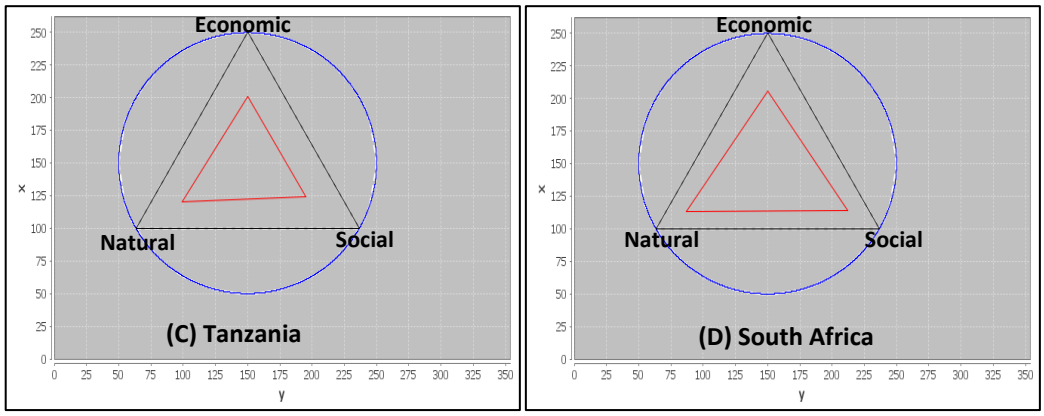


Figure 4.8: National SD Triangles for Tanzania and South Africa

Source: Researcher's data analysis (2016)

From *Figure 4.7*, Ghana's SD triangle (red-lined triangle) shows that it has a strong inclination towards social sustainability, a little above average on the environment, and low output towards achieving economic sustainability. The DRC's red-lined triangle is below the mid-level reach of 50% on all three systems. Tanzania's graph based on the scores show a tilt towards environmental system. However, South Africa's SD triangle (in *Figure 4.8*) shows good progress towards ideal view of sustainability (indicated by the black-lined triangle) bordering the blue circle. All in all, it can be said that South Africa has made significant progress on sustainability

ends; however, the same cannot be said for the three other countries since balancing within the three systems has been challenging (see *Figures 4.7 and 4.8*).

4.6 Lessons from the National Sustainable Development Applications

Despite the data limitations and reliance on international indices in some contexts, the above findings point to the challenge in realising SD in terms of the triple bottom line for countries. Also, how countries define sustainability in mining determines how effective mining's contribution to SD would be for the industry and a nation. Hence, there is a need to redefine SD bearing in mind the peculiar and regionally common challenges faced by mining countries. For some countries, the pre-conditions such as good governance, strong institutions, infrastructure and socio-economic development were inadequate to support a strong SD agenda for mining (case in point is the DRC).

There are some strides being made towards social and environmental sustainability; however, the findings also showed deficits in economic sustainability for the countries. South Africa's MPRDA (with its BBBSEE charter) provides a blue-print to enhance the critical linkages of mining to the national and local economy. Considering Ghana and Tanzania, although they have reached some of the pre-defined minimum conditions for social and environmental sustainability (through national regulations and implementation strategies), it further requires effective benchmarks and target-setting to build the needed economic and social linkages of the gold mining industry with the broader economy.

On the other hand, the plethora of fiscal and social instruments[45] that are currently introduced in the name of SD are also placing mineral economies under pressure – not

[45] Examples of special costs and taxes falling into this category are ownership targets; social and labour plans; export levies for forced value-addition; environmental taxes; schemes for targeting windfall profits; resource nationalism instruments; etc.

so much because of the governance challenges, but rather the considerable economic cost of compliance. This sometimes comes at a cost to national sustainability efforts which are weakened when similar standards for national level monitoring are non-existent.

Conclusively, the sustainability agenda has brought about an unequivocal justification for the premiums placed on environmental protection (as was argued in Chapter Three), together with the balancing of natural wealth for inter-generational equity and welfare of current generations. However, the ideal SD definition must be refined for mineral economies in Africa. This is because placing equal premiums within the processes of each system jeopardises the end goals of sustainability when the minimum conditions required for each system has not been met in the pursuance of the balancing components (see Bass, 2007). Therefore, RRA countries should consider alternative pathways for optimal development of mining vis-à-vis SD considerations that best suit their interest and unique context.

4.7 Conclusion

The discussions in Chapter Three showed that SD is a multi-faceted issue for mineral economies and suggested re-assessing sustainability in mining based on relevant indicators and benchmarks for Africa's unique context. As a result, this Chapter defined indicators for measuring SD at the national level for gold mining countries. Although, there was no reason to focus solely on gold, Chapter One (section 1.9) indicated that gold is significant for rural and national economic development. The Chapter further discussed the methodology used in the selection of the countries as well as the indicators relevant for measuring sustainability in mineral economies. Evidence from the assessment of the four countries showed mixed progress in all the dimensions of SD. In some instances, like economic sustainability, countries

performed averagely to poorly. On social and environmental sustainability, the metrics showed good to average results for some countries (Ghana, South Africa and Tanzania). The lessons from the findings suggested that the balancing components remains challenging if pre-conditions (success factors) such as good governance and institutions are minimal. This confirmed some of the discussions in Chapter Three about finding alternative pathways to realising the SD agenda for African countries using mineral wealth for development.

In a similar discussion, the IIED in Bass (2007) pointed to the need to deviate from the norm of balancing components or triple bottom line view of SD because of the inability of States to maintain the same levels of optimality within the three systems. Per Bass (2007), *'...many local institutions have evolved precisely to integrate changing social, environmental and economic objectives in people's daily lives, to make clear trade-offs where integration is not possible, and to foster equity within and between generations – in other words, for sustainable development… we need to bring on board discourses and traditions that have been missing from the sustainable development debate, asking 'what is desirable to improve the quality of life?' (p. 3-4).* The assertions by Bass (2007) reinforces the need to explore SD and identify renewed ways of defining sustainability to suit the unique context and challenges faced by mining countries in Africa.

In this regard, the next Chapter explores the concept of optimal mining and how it best fits into the discourse of SD and the critical linkages needed for the economic development of RRA countries, specifically gold mining economies.

Chapter 5

Optimal Mining and Sustainable Development- Establishing the Link for Growth and Development

5.1 Introduction

This Chapter introduces optimal mining in the context of SD. The previous Chapter showed that SD as is currently interpreted by national economies in Africa is difficult to attain. As such, there is a need to explore renewed ways to adapt to sustainability principles.[46] Chapter One's discussions proposed optimal mining or 'optimal mineral development' as one of the ways to re-interpret SD for mineral economies. However, in tracing from literature, how similar is the concept of optimal mining to SD? To answer the above question, the Chapter aims at two things: firstly, to dissect what optimal mining means and draw linkages between the concept and SD. The second point of this Chapter is to lay the foundation for the development of a national investment Strategy in Chapter Six. The linkage between optimal mining and SD is expressed as sustainable economic development.

The Chapter further purports that like SD, optimal mining is also an economic and governance issue that must be seen from an economic perspective to further sustainable growth ends for RRA economies. Optimal mining is discussed in light of how *to balance regime stability with (new) policy instruments for rent generation, capture and the management of investments required for growth* in the purview of Africa's unique challenges. There are three objectives set to be achieved in this Chapter- these are:

[46] Although, assumedly, some stakeholders and institutions have moved away from the triple bottom line definition, the majority of developing mineral economies in Africa interpret SD in this context.

1. Introduce the concept of optimal mining in the context of SD;
2. Discuss the essentials for the SED of mineral economies; and
3. Develop a checklist to guide the design of an optimal mining investment strategy for mineral economies.

5.2 Reconceptualising Sustainable Development for Mineral Economies

The assessment conducted in Chapter Four brought to bear some of the challenges in operationalising the SD concept in mining regimes in Africa. In some African countries, political uncertainty, dissatisfaction with the use of rents for development, and the weak presence of success factors, such as good governance, efficient institutions and *'political will'* resulted in the poor to average performance on the sustainability indicators in Chapter Four. The weak efforts at strengthening some of the success factors, led to the difficulty in realising SD ends, *vis-à-vis* mining's transformative role for economic development. Entirely on the different manifestations (based on the final SDI and the size of the SD triangles) in Chapter Four, the research opines that the triple bottom line view of sustainability may not necessarily transform mineral economies in achieving the goals of SD.

At the core of the SD debate is whether the convergence of the social, environmental and economic pillars does not leave open critical questions of value systems and what a nation or government should consider as its goals. The different systems within SD (as illustrated in *Figure 3.1,* Chapter Three) must equally intersect for true sustainability to be realised. National goals must aim at balancing economic development with equity and efficiency, allowing for SD while the governmental systems and institutions enforce industry compliance.

Conversely, how one defines SD would inform the premiums placed on each system, the size as well as the level of intersection of SD, most ideally. Usually, this would be

reflective of the culture of the society i.e. its systems, institutions, principles and ethics, which define their way of thinking and invariably lead to which system is more important, and eventually to trade-offs. To emphasise this point for example, *Figure 5.1,* shows a stylised representation of the triple bottom line of SD and the state of sustainability in the sample countries that were used for the assessment - the circles are extracted from the average scores of the SD systems in Chapter Four.

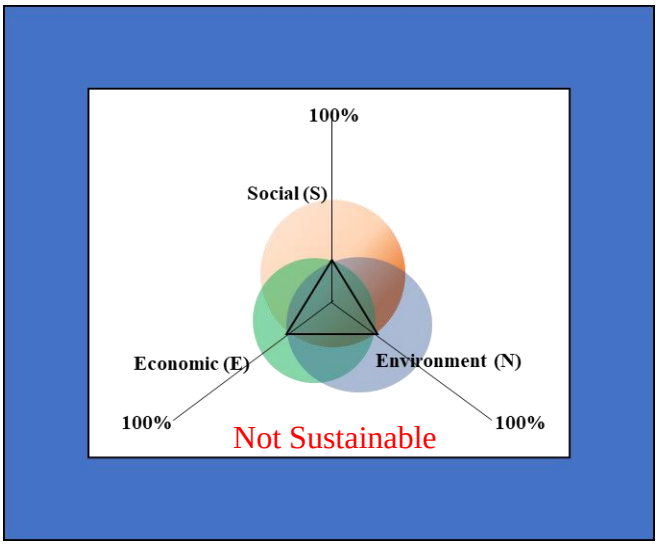


Figure 5.1: The Current Tempered Triple Bottom Line model of SD

Source: Researcher's Interpretation (2016)

The *Figure 5.1*, which is a tempered triple bottom line is indicative that sustainability is not realisable at the midpoint. Implementing SD remains challenging since in each case, the understanding of its implementation is bent towards one, or the combination of two spheres. This confirms the review in Chapter Three and the assessment of the four countries in Chapter Four. The environmental and governance issues seemed to take the lead in the 1980s and 1990s with a lesser focus on the economics and social issues. Also, the smaller nexus of all three intersecting circles further shows the challenge of optimising sustainability in mineral economies. That said, the importance of the governance dimension remains paramount in realising SD goals in mining as acknowledged by the IIED-MMSD (2002).

Recent developments post 2000, have also suggested that the current focus is now on the social and environmental issues, while some are under-appreciative of the importance of the economic dimension as cautioned by Crowson (2001). Hilson and Murck (2000) and Humphreys (2001) have justified that the industry's drive to SD through greater environmental and social governance can increase profitability. However, it is pertinently subjective because profitability depends on global demand factors, costs, resource discovery, economic profitability of extraction, and the strictness of the regulations, which govern mineral development. Therefore, the promotion of economic efficiency of the industry should be revisited and integrated with environmental and social concerns contoured on good governance.

In his candid opinion, Cawood (2011) asserted that the economics of the project ultimately determines how sustainable the integration of social and environmental concerns under good governance would be for a mineral project. This is fundamental under the economic theory of the markets because if a firm or industry does not optimally combine its factors of production, it stands to make losses when the cost of production is higher than market price. This is apparent in the extractive industries, hence the need to optimally combine the factor inputs such as land (or minerals) in this context, labour, capital and enterprise.

Optimal mineral development as is purported, implies the application of optimal extraction techniques, processes, and optimal (economic) utilisation of goods and services generated from mineral resources (see Cawood, 2009; 2011). It further connotes a realisation of greater economic efficiency (at the firm level) to enhance sustainable economic growth, equitable distribution of resources, and greater ecological governance between current and future generations (at the national level).

In the final analysis, the current view of SD in mining as interpreted by the MMSD is critical for RRA countries. However, who defines these goals within the 'locale' is as important as how that party interprets SD and the world view with which they subscribe to (see Sexton *et al.,* 2008: *for the anthropocentric versus ethnocentric views of sustainability*). Because MNCs are party to operating within the confines of their jurisdictions, when SD principles and goals are not well integrated and aligned to the current stage of economic development of a country, it leaves room for value judgements and trade-offs (Gasparatos *et al.,* 2009).

With that being said, re-conceptualising SD for mining as a process, which commences with an optimal mining view can provide a unique path for using mineral rents to contribute to the development of RRA countries. The following sections discuss what optimal mineral development means in terms of the value chain and its transmissions. Also, the linkages between SD and optimal mining are probed with the conclusion that for mineral economies, at their current stage of development, the process of SED can facilitate overall development.

5.3 Optimal Mineral Development in Mineral economies and Industry

'Optimal' mining is embedded within the concept of SD. It presupposes a type of 'mining' where the best approaches and alternatives are considered along the mining value chain, with strategies for maximally sharing mineral rents between the State, communities and mining companies (as already noted). In a paper by Cawood (2011), he asserted that optimal mining is the focus on the profit motive in mining while mitigating for the costs of mining and compensating for the impact on the environment and society… "as well as to allow for tangible benefits for the host country (Ibid,

p.3).[47] This speaks to three fundamentals of optimal mining- that is extraction, capture and management of rents to provide the highest satisfaction for all stakeholders.

Taking into consideration these fundamentals, Porter's (1985) model of the value chain is used (as the framework) to analyse the concept of optimality and SD in mining. What does the value chain entail with regards to mining? Vorster's (2001) paper contextualised Porter's (1985) framework of the value chain for the mining sector. Using an adapted version, the mining value chain for illustration purposes is simplified and presented in *Figure 5.2*.

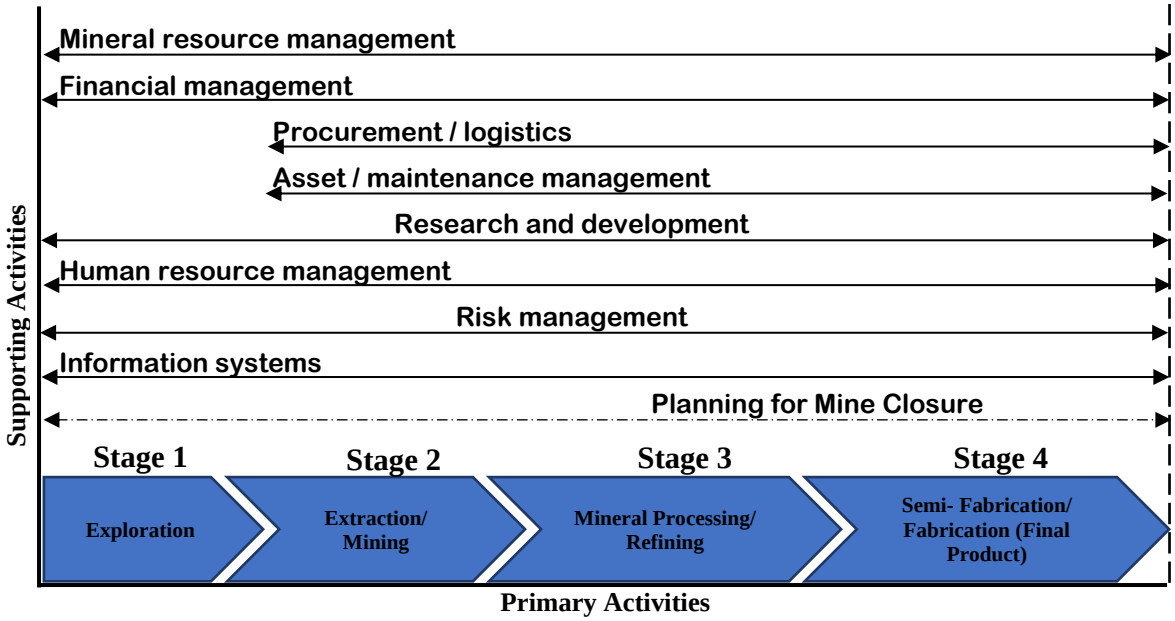


Figure 5.2: The Mining Value Chain

Sources: Adapted from Vorster (2001)

The auxiliary activities in *Figure 5.2* (cited in Vorster, 2001) show the range of supporting activities that enhance the mineral development process. Optimal mining within the entire process is focused on efficient rent capture while mitigating the costs of mining and compensating for the impact on the environment and society.

[47] Cawood (2009) traced the concept of optimal use through international law to establish whether South Africa's mineral and development frameworks imbibe optimal use principles in mining.

As has been previously established, optimal mining is embedded in the SD framework. Optimal mining and SD are intertwined. The concept proposes the use of optimal techniques in extraction, use and distribution of rents at the microeconomic (firm) level, whereas at the national level, SD proposes national instruments that guide the implementation of the mining processes within and outside the mining value chain. In terms of the three transmissions, *Figure 5.3* illustrates where optimal mining and SD are situated in the context of the value chain.

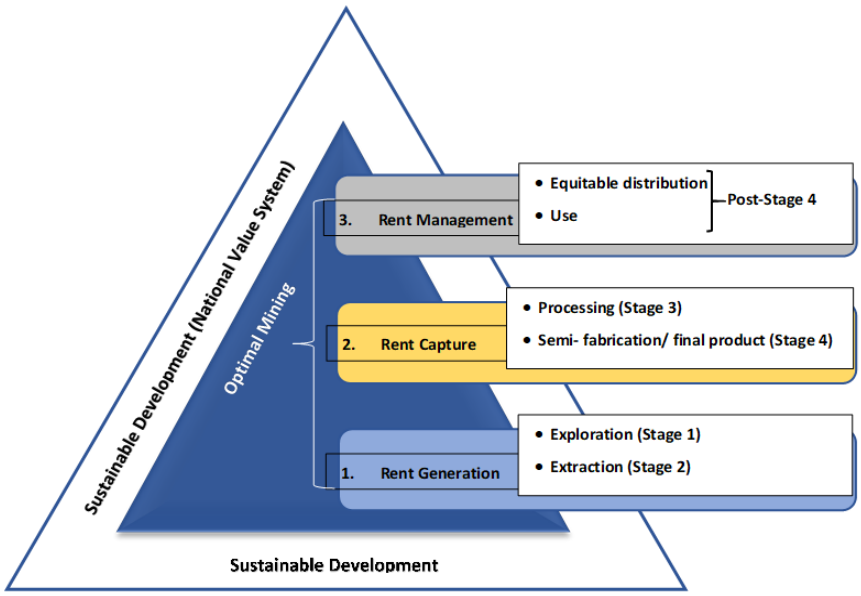


Figure 5.3: Situating Optimal Mining and SD in the Value Chain
Source: Researcher's Interpretation (2017)

From *Figure 5.3*, optimal mining under step (1) *'rent generation'* proposes optimal extraction techniques, but this may not guarantee SD without access to skilled workers, technology and innovation, finance, and adequate environmental protocols to safeguard externalities from mining. Likewise, the elements within *rent capture* and *rent management*, steps (2- 3) may not result in SD without adequate optimal instruments for garnering rents such as the linkages within the value chain and the monetary and fiscal policies for harnessing rent.

Optimal mining is steered at the company level (see steps 1, 2, 3 in *Figure 5.3*), whereas SD provides the overarching framework at the macroeconomic level to guide mineral development in the value chain (in all the steps, from 1- 3).

Due to the importance of rents in mining, the linkages are further explored under the three fundamentals of optimal mining, which is rent generation, rent capture and rent (revenue) management in the value chain at the micro and macroeconomic levels. *Figure 5.4* lists the transmission process in optimal mining with explanations following suit after the figure.

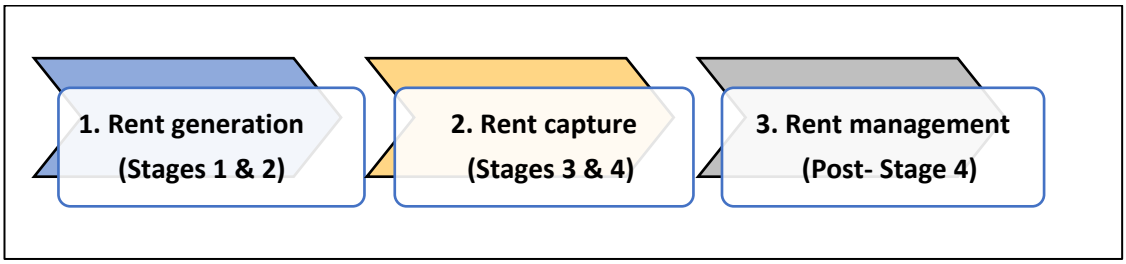


Figure 5.4: Optimal Mining and SD Linkages

Source: Researcher's conceptualisation (2016)

The explanations are grouped under macro and microeconomics issues of relevance to mining in developing mineral countries' context.

5.3.1 Rent Generation (Stages 1 and 2 of the Value Chain)

In discussing the concept of optimal mining and SD, the section traces the legitimacy of the concept in international law. Here, it is the right of sovereignties to decide what is 'optimal' and sustainable in their regulatory frameworks. In this regard, many international and regional frameworks are of relevance in giving countries the sovereign right to utilise optimal mining instruments and SD principles in their jurisdictions. Because 'rent generation' connotes that the legal foundation should have been laid, some of the international instruments to support optimal mineral development are discussed.

Macroeconomic concerns

Under rent generation, some of the instruments include:

- Permanent Sovereignty over Natural Resources (PSONR) (1962);
- Right to Development (A/RES/41/128) (1986);
- African Charter on Human and Peoples' Rights (1981);
- African Mining Vision (2009).

The *Right to Mine* (RTM) which has a bearing on the international principles of *Right to Development* (A/RES/41/128) 1986 and *Permanent Sovereignty over Natural Resources* (PSONR) 1962 are critical elements for SD and optimal mining (see UN, 1986; United Nations, 1962).

The *Right to Development* (RTD) is an instrument for legitimising optimal mining, this is because its human rights principles recognise all the PSONR tenets and further argues that *"States have the primary responsibility for the creation of national and international conditions 'favourable' to the realisation of the right to development"* (UN, 1986, Article 3 on the RTD).

Agenda 21 (UNCED, 1992) clarified some of the implications of the adoption of environmental and social principles on mineral economies, such as the importance of environmental protection for growth and development, as well as natural (mineral) resources' significance for development. This led to consideration of mining's impact for SD in latter UN documents on SD. Two chapters on mineral resources and Africa's development were discussed in the Johannesburg Platform for Implementation of SD in 2002.

Also, in the 'the future we want' (UN Resolution 66/288, 2012) in 2012, there was a strong call for responsible mining with regards to the exploitation of resources premised on the Rio Principles in Agenda 21 and to use mining as a leverage for maximising social and economic benefits (Ibid; p.44 on SD). It is important to note

the distinctions between optimal mining and SD based on these instruments. In the international literature, the majority of the general instruments speak to SD principles over and above 'highest and best use' (at the company level) which may be in the interest of African states. Thus, optimal use (mining) instruments should be asserted at the company level with SD providing the basis at the national level.

Under stages 1 and 2 of the value chain (under rent generation), the structure of the mineral development agreements (MDAs) is important in deriving more benefits for developing economies with MNCs. Governments must ensure that the 'development imperative' is asserted in the MDAs, while setting environmental standards for monitoring. The legal instruments for community assent in 'social licence to operate' by companies must be entrenched through due process, coupled with community development obligations and providing standards for mine health and safety of workers employed in the extraction process at the firm level.

Microeconomic concerns

In terms of microeconomic concerns, the nature of resource extraction dictates that optimal extraction techniques are applied to mining projects with the factors of production optimally allocated for maximum profit (see arguments in Section 5.2). Here, understanding optimal extraction techniques by optimising on NPV and managing extraction costs; infrastructure development and mine planning can enhance the competitive advantage of mine development for a viable mining enterprise (Runge, 1998).

5.3.2 Rent Capture (Stages 3 and 4 of the Value Chain)

Microeconomic and Macroeconomic Concerns

Under rent capture, "the viability of the minerals industry cannot be compromised by regulation of optimal use because the minerals industry cannot contribute to SD if

companies cannot survive and succeed" (Cited from Cawood, 2009 and in IIED-MMSD, 2002). Governments must therefore ensure that certain economic fundamentals such as the (skills and infrastructure) are readily available through an effective mining tax regime, while creating the environment for new technologies to increase output in mineral processing at the company level.

Both SD and optimal mining instruments can be found in the forward and backward linkages for rent capture, including the beneficiation of minerals for local and national development. In stages 3 and 4, optimising on milled ore and fabricating semi-finished products are concerns in optimal mineral development. In this process, waste management and disposal of effluence from processing must be conducted within international standards and the mandatory national regulations set by the State. Here, also, protocols for optimal mineral development are needed at the microeconomic level, with national SD instruments to shepherd how mining businesses are conducted. Typical supply chains servicing the mining industry in upstream, downstream and side stream are functional vehicles for rent capture that precipitate the linkages between the mining enterprise and the local economy for SED.

5.3.3 Rent (Revenue) Management (Post-Stage 4)

Macroeconomic and Microeconomic Concerns

Beyond rent generation and capture, rent management concerns lay in adequately determining a fair share of rent (firstly) between the investor and government, and secondly optimally distributing rents for SD. On the part of government, the diverse stakeholders within the value and supply chains influence the size and share of profit (or rent). At the microeconomic level, it is the 'would be' contending staked interests that define the size of the rents after all cost deductions have been made. Therefore, the critical question to ask before the pursuance of a mining project and to assess the

reaction of stakeholders is for (owners of capital) to ascertain what minimum market share would be sufficient to achieve significant market influence so that the project's worth would be optimal (Tiess and Tieswsoh, 2011).

In buttress with the above point, it is also dependent on the economic and physical scarcity of the ore, grade of the ore body, accumulation of capital, population, skills, technology, innovation and macro-fiscal disciplines (such as taxation and royalties) that regulate the rent incentive structure. As such, managing the expectations of stakeholders within the factors of production would require optimal use of scarce resources, by firstly understanding rent generation; as well as finding innovative ways of managing stakeholder expectations for the welfare of all.

5.4 Sustainable Economic Development the 'Link' between Optimal Mining and Sustainable Development

In summary on SD and optimal mining linkages, mining is ultimately about converting natural resources into economic rents, thus how a State uses, extracts and distributes rents generated must be tied to its national development strategy. The uniqueness of the industry warrants optimal strategies to successfully use fiscal instruments (at the national level) to obtain a fair bargain for rent. However, when considering the peculiarities of Africa's economic development, and the economic sustainability deficit from the assessment in Chapter Four, it is opined that a focus on SED as a national ideology is warranted for the growth of mineral economies.

Per previous discussions in Chapter Four, some of the pre-conditions for environmental stewardship and social development have been laid and are being fulfilled in mining countries. Therefore, focusing on SED provides an avenue to strengthen economic sustainability of mining systems in Africa. Why is the researcher making this assertion? From an economic sustainability viewpoint, Pearce (1988) and

El-Serafy (1993) have argued that the process of change for SD could be achieved if a minimum condition for development (welfare maximisation) can be set. When a low-income (or lower middle income) economy is dependent on mineral rents, and has set the parameters for a non-decline in its stock of natural capital (Solow, 1986), such as in terms of environmental protection, social equity and economic development, then a focus on achieving SED logically is warranted within the discourse of SD for mining.

This is so because the goal of SED seeks welfare maximisation of people and of the biosphere as well. Realistically, governance and economic issues within optimal mineral development are also legitimate concerns for SED. Therefore, bearing in mind Africa's unique challenges, the key economic problem of meeting welfare maximisation has been incorporated into the SD agenda under SED to facilitate development. This further implies that governments should endeavour to provide a strong set of SD rules and a framework for optimal mining at the national level by adopting SED as a national value system instead of merely pushing the burden of rent capture, generation and management mostly to extractive industry players.

5.5 Defining Sustainable Economic Development for Mineral Economies

What is sustainable economic development and what should it mean for mineral economies? SED is the focus on the economic perspective in SD. It aims at bridging the gap between optimal mining and the shortcomings of the traditional view of sustainable development. To provide context on SED, this section traces from literature the process of *Sustainable Economics* (SE) for sustainable growth.

Gilman (1992) was the first to introduce the concept of SE as a 'new' process for development. He argued that the current market economic system with its underlying

foundation of production and consumption as the basis for growth is the bane for SD. Ekins and Max-Neef (1992) and Baumgartner and Quaas, (2010) expanded the approach of SE and have attempted to define it, provide theoretical foundations for the concept and its relevance for economic theory. Baumagartner and Quaas (BQ) (2010) premised their definition on certain four attributes as key in sustainability/ sustainable economics. These they identified as:

- A focus on the relationship between humans and nature;
- Orientation towards the long-term and inherently uncertain future;
- Normative foundation in the idea of justice, between humans of present and future generations as well as between humans and nature; and
- Concern for economic efficiency, understood as non-wastefulness, in the allocation of natural goods and services as well as their human-made substitutes and complements.

BQ (2010) include a new dimension of economic efficiency which they understand as non-wastefulness (optimality) in the allocation of natural goods and services. The Thesis's point of view is that for resource-rich states in Africa, SE can facilitate the outcome or fulfilment of the goals of SED. SE and SED are synonymous and encompass various forms or strategies aimed at economic development such as local content, CSR, beneficiation and even environmental management of mining's impact. However, the current state in terms of rent usage and management suggests that an optimal mining investment strategy be designed and linked to the different elements within SED strategies for the growth of RRA countries.

5.5.1 Sustainable Economic Development: Rationale for an Investment Strategy for Mining

Auty and Warhurst (1993) have posited for developing mineral economies to refocus rents usage on investments for the creation of surplus value, while instigating environmental management standards, newer technologies and building other sectors

of the economy besides mining to reduce dependence. Therefore, SED in mining represents two tenets: (1) stewardship of minerals; and (2) value creation.

On both tenets, the onus to create an enabling environment lies on governments to enhance trust and build transparency in mineral revenue management while espousing the goals of economic development from mineral resources for the State. In terms of the two tenets, (the discussions in Chapter One) alluded to the fact that an SED Strategy couched on investments can ensure the long-term sustainability of minerals (for future generations) while concurrently remedying the effects of the Dutch-disease in Africa. Below is a re-interpretation of SD in the context of SED for the industry and how it can best contribute to sustainable growth (see *Figure 5.5*).

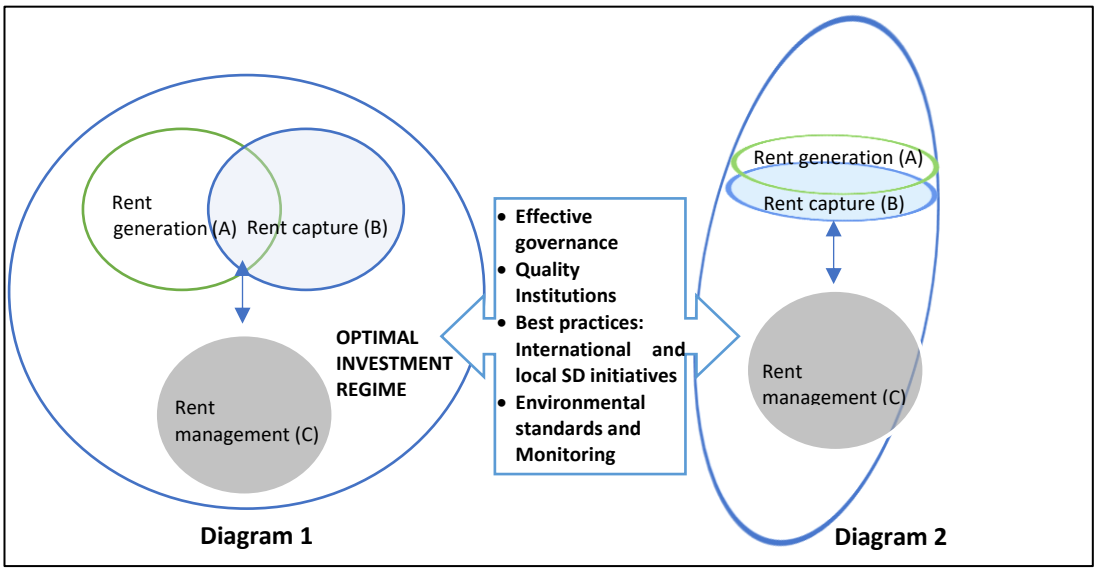


Figure 5.5: An Interpretation of SD for Developing Mineral Economies
Source: Researcher's Interpretation (2016)

Figure 5.5 argues that the three transmissions in optimal mining (rent generation, capture and management) are cogent for SED bearing in mind effective governance, institutional quality, environmental due diligence and local SD initiatives for economic development. The foundation for SED in mineral economies is an efficient investment regime pegged on the pre-conditions/ requirements (listed in between

diagrams 1 and 2) for surplus value (rent) to be optimally re-invested. Expansively, twelve requirements for SED are further espoused in Chapter Seven of the Thesis. Diagram 2 (*Figure 5.5*) is a projection of how optimally combining rent generation and capture within a management framework or strategy is essential for the SED of mineral economies. Additionally, the argument in *Figure 5.5* is extended in *Figure 5.6* based on mineral rents (metallic resources) or ore producing countries of SSA and its relationship with world and SSA's growth rates from 1990- 2015.

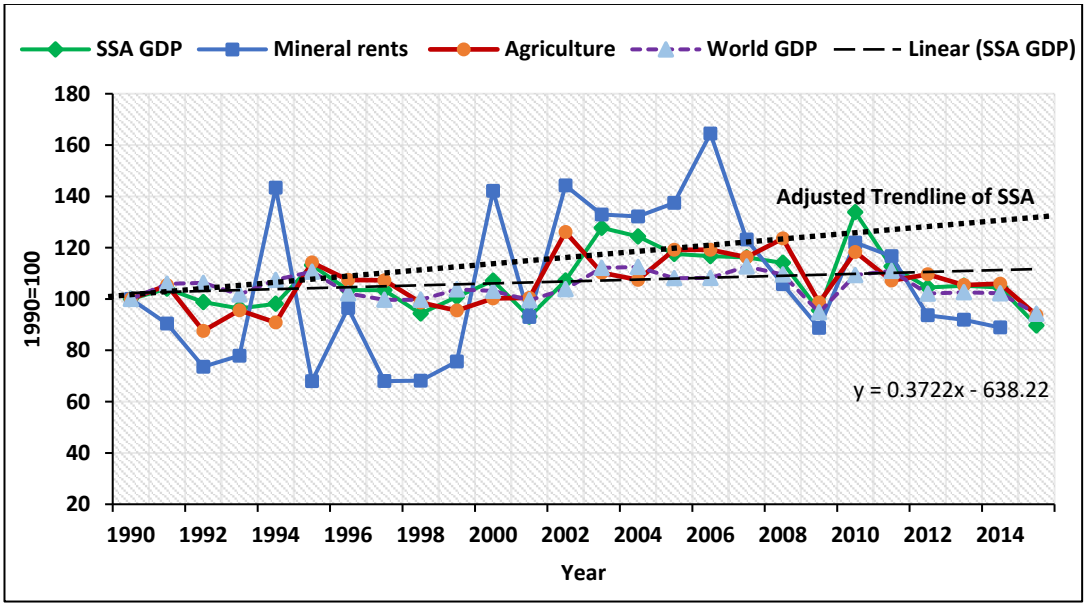


Figure 5.6: Mineral Rents and GDP Sub-Saharan Africa (1990- 2015)
Sources: World Bank (2016)

From *Figure 5.6*, an argument for SED using mineral rents (this is under rent management) hinges on how different portions can be utilised in reducing the pro-cyclicality of government spending and counteracting the effects of the RCT. A portion of rent (above the adjusted mineral rents trend line) can be invested in a fund (for future generations) or invested in a fund for development. [48] Another portion can

[48] A success story is Botswana's Pula Fund, which was established in 1993 by the government of Botswana. The fund reflects both savings from accumulated fiscal surpluses and mineral rents. IMF (2012a) discussed options in managing resource volatility by considering instruments such as wealth funds. In Botswana's case, investments from the funds helped stabilise the economy in the 2014- 2015 fiscal years. Also, the analysis by

also be captured into a wealth fund to protect declining GDP (shown below the SSA GDP trend line), with the middle (in between the two trend lines) incorporated into annual budgets for spending and physical capital development. Here, overcoming the limitations of the Dutch-disease with an investment strategy pegged on SED can fulfil the traditional objectives of economic development through welfare gains for all citizens in a mineral economy and the biosphere. The second part of the Chapter focuses on the SED process and investments.

5.5.2 The Sustainable Economic Development Process and Investments

Based on the above discussions, any SED strategy must be viewed as a spiral process at the microeconomic level where benefits are generated, captured and maximally-shared between the interests of governments, land owners, mineral right holders and indigenous peoples. A fair share of protecting the interests of the environment would have to be factored since all resource operations are within the confines of the biosphere. *Figure 5.7* presents the spiral process for SED. An international investment regime's provisions inform a national investment strategy and an enabling extractive sector policy to facilitate effective generation and distribution of benefits amongst interest holders, while managing the expectations of an economy's resource endowments.

Triki and Faye (2011) showed the importance of investment funds for Africa's growth trajectory. Although, in the context of SWFs a large majority of the funds are from oil revenues for stabilisation reasons, there has been a rise in investment funds from ores and metals (Ibid).

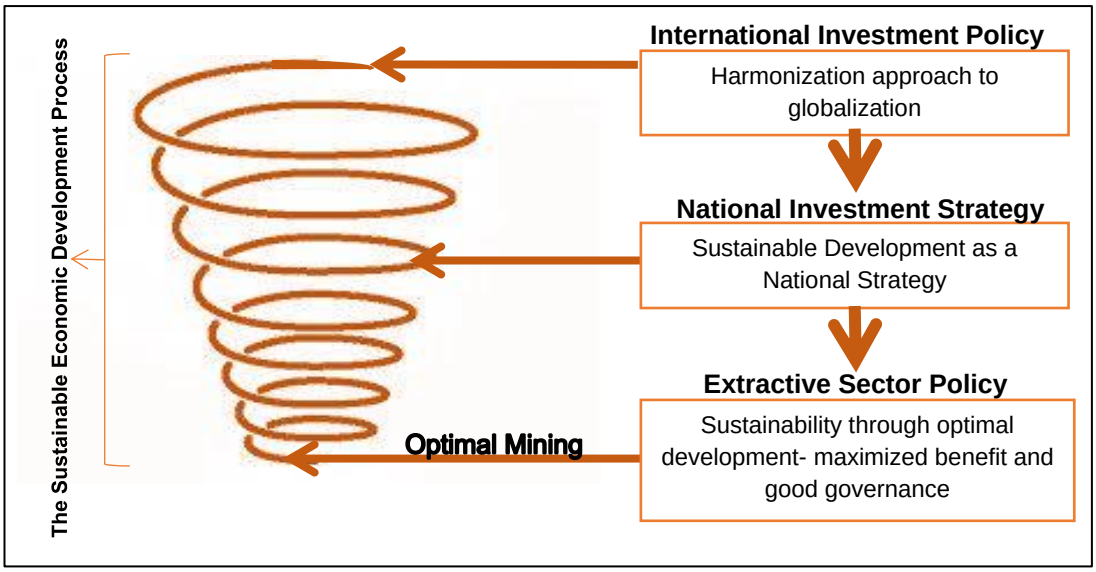


Figure 5.7: The Spiral Process of Sustainable Economic Development
Source: Researcher's Interpretation (2016)

At the macroeconomic level, an integrated national level strategy is the mechanism for transmitting all SED strategies (which in this case focuses on investments for mining). Also, *Figure 5.7* proposes a policy-making process embedded in regional harmonisation for achieving SED. This must however be subsumed into the broader economic integration framework to solidify the alliances of smaller countries in the pursuance of SED values at the regional level. The aim is for global or regional economic instruments to be aligned to the peculiar needs and expectations of developing mineral economies for SED. This must afford mining sovereignties the *political will* to decide on concerns that serve their local/national and regional interests for development. Specifically, RRA countries should fully exercise their RTD/ PSONR without criticism but with due consideration of the unique challenges that their economies face.

5.5.3 Optimal Mining Investment Strategy

Since the earlier sections discussed a focus on an investment strategy for SED specific to mineral economies, what factors must be inherent in an optimal investment

strategy? At the national level, a national mining investment Strategy for SED must have three clearly defined elements:

1. The needs/ obligations of the investor and the host nation must be identified;
2. The expected or desired outcomes must be set; and
3. The type of investment that a host country is seeking and how it aims to achieve its intended expected outcomes.

In all cases, the host nations must be able to align the type of investment with the national objectives or development priorities (Matshediso, 2005; Okonjo-Iweala, 2010). Often, the needs of the investor are aligned towards profits while the investee nation might want to meet demand expectation by usually lowering the entry barrier to gain a fair share of foreign investment. Although that is usually the case in mineral regimes in Africa, both parties must be able to define what they want and have standards or criteria set to level the playing field.

Assertively, in many parts of Africa, the environment for mining investment is not well-integrated with the mining and political regimes' objectives (see ECA-AU, 2011; Otto, 1997; UNCTAD, n.d.). These types of political uncertainties magnify the risk factors associated with mining investment, as such making it a complicated process for investors to apportion a good share of profit (and rents) between the company and government.

Since optimal mining commences at the microeconomic level and SED must be realised at the national level, the elements (transmissions- rent generation, capture and management) discussed in section 5.3 are transitioned as a checklist to guide the development of an optimal mining investment strategy for SED. The checklist (see *Table 5.1*) consists of what the investor and investee nation should consider and make provisions for, when deciding to create a sound mining investment environment.

Table 5.1: Common Checklist for an Optimal Mining Investment Environment

Checklist for Mining Investor and Host Country	
(1) Rent Generation (Stages 1 and 2 of the Value Chain)	
Macroeconomic issues	
Geographical reach of SD	Do the regulations provide for the geographic reach of mineral development? Have relevant international SD initiatives been ratified in the legal framework for monitoring and compliance of mining companies?
Fiscal regime	What is the host country's tax system, i.e. royalties, income tax, corporate tax, etc.? How stable is it and how does it interact with that of the investor's resident country? What are the transfer pricing policies/ rules of the interested party State?
Mineral Development Agreement (Rights and obligations of government)*	Is there clarity on obligations (of the company) and are there stabilisation agreements on local economic development and environmental management in the legal framework? Is it mutually agreed and understood between the parties?
Environmental law	What standards must be observed and what penalties apply in case of failure or non-compliance? Are there international standards? (Are they applied by the company or by the State?). Is there provision for compensating future generations in law for environmental damages?
Microeconomic issues	
Mineral Development Agreement- MDA (tenure, rights and obligations of the company) *	What types of bilateral and international investments treaties already exist and would the investor require specialised agreements on tenure, tax, financial arrangements and royalties?
Political risk factors	Is there stability in the investment environment, i.e. on environment, labour and Health and Safety (H&S)? Are there calls for resource nationalism and can government guarantee the safety of mining investments? Have previous MDAs been brought under scrutiny/ or to courts for adjudication?
Socio-economic factors	Are there infrastructure, skills and the requisite human capital available for mining, or are there deficits? Will upgrading or providing foreign expertise come at a significant cost to the company? Are skills and labour development plans framed in the context of the State's (and local government's) development objectives? Are they being addressed with the company?
Technology and innovation	Are there provisions for protection of technology and innovation of the company? Are there legal spaces for knowledge and skills transfer in technology and innovation management between the company and host government?
Environmental obligation	What are the stipulations for environmental impact assessment and management plans for the mining site? Are the standards compliable by the company?

(2) Rent Capture (Stages 3 and 4 of the Value Chain)	
Macroeconomic issues	
Environmental due diligence (Community)	Are there industry regulators and are they transparent? Are there frequent monitoring of environmental standards of mines? Are legal reviews and appeal processes available against adverse environmental impacts?
Health and Safety (Community)	Are there national H&S standards and do avenues for monitoring exist? Are there institutions that conduct health and safety checks within the mine?
Local Content	Are there local content standards or strategies in the legal framework and are there avenues for support of local institutions and monitoring and compliance of the regulations of mining companies?
Value Addition (Beneficiation)	Does the country have a beneficiation strategy and are there standards for mining company's compliance? Is there an industrial policy which is in synch with mining laws and are local manufacturing companies capacitated for beneficiation? Do the requisite skills for beneficiation exist in the country?
Microeconomic issues	
Environmental due diligence (Company)	Besides the regime's requirements, does the company uphold ethical and voluntary environmental requirements in relation to waste generation, disposal and climate protection? Is there provision for compensating future generations in law for environmental investments?
Health and Safety (Company-Occupational)	Are internal processes consistent with the national requirements? Are international protocols such as the OHSAS 18001 and others applied?
Optimal milling and accountability (Company)	These are internal matters within the company; usually, international standards in milling, processing and refining are applied- Are enhanced processes for transparency in ore accounting, milling and processing applied?
(3) Rent Management (Post Stage 4)	
Microeconomic issues	
Risk management	How would risk factors, such as pricing on the part of the investor be mitigated transparently? Are there establishments of standards and codes of practice?
Macroeconomic issues	
Administrative law	Are there any remedies for improper decisions of government officials and are there accountability mechanisms to check how governments use mining revenues?
Institutional framework	What institutions support the type of mineral investment environment and revenue management?
Dispute resolution	What laws are used to govern investment agreements and can disputes be resolved in a neutral forum?

Investment Policy (for Benefit Sharing)	How would benefits be shared and invested? How would they be synchronised with both fiscal and trade policy? Would there be considerations for a Sovereign Wealth Fund?
Risk management	How would risk factors on the part of host country be mitigated transparently?

Sources: Author's synthesis from: (Cawood, 2009; Mann *et al.,* 2012; Otto, 1997; Pritchard, 2005, 2005; PwC, 2015; World Bank, 1992)

*Typical MDAs cover a range of mining issues and serve to protect the investor's mining investments from uncertainty and high risks. However, this checklist is aimed at both demand and supply sided issues of mining investments for consideration by the investor and host State.

The above elements (in *Table 5.1: Common Checklist for an Optimal Mining Investment Environment*) although reminiscent of model MDAs go beyond that to also consider the supply-sided aspects of what an optimal mining investment should resemble for host governments (see section on rent management). The point of the table is to guide the design and implementation of a national mining investment strategy in Chapters Six and Seven.

Some of the elements (or questions) in the checklist are strategised as plans for how gold producing countries can devise investment strategies for the SED of their regimes. Besides aligning the checklist with the national development objectives of the State, the institutional framework to kick-start a mineral-led development growth through an extractive sector policy is crucial within the agenda of good governance (see a similar analysis by Dougherty, 2011 for the case of Botswana). The Thesis discusses this under the plans and mechanisms for realising the investment Strategy in Chapter Seven.

5.6 Conclusion

In conclusion, the Chapter discussed the concept of optimal mining and SD and concluded that SED would be needed for the growth of mineral economies in Africa. The Chapter also confirmed that 'optimal mining' would be a key lens for viewing

sustainability at the microeconomic level. In exploring the concept of SED and what it means for mineral economies, it recommended an optimal investment strategy at the national level for realising SED ends. This further led to the development of a checklist to guide the designing of national mining investment policies and strategies at the micro and macroeconomic levels for Africa's development. However, due to the global and regional SD reach of mining, it was pointed out in the Chapter that regional integration and harmonisation of policies would be fundamental for the development of Africa. Mineral economies may have to take a stand on regional harmonisation and have a unified front if SED strategies for the growth of RRA countries are to be internationally accepted.

Considering discussions in this Chapter, the next Chapter focuses on developing a national 'optimal' mining investment Strategy for the SED of gold mining economies. It is important to point out that the Strategy from which the Framework is developed is distinct from the SDI that was conducted in Chapter Four. The SDI shed clarity on the challenge of operationalising SD in mineral economies and hence pointed to a refined view of SD. Thus, the following Chapters focus on an investment Strategy and Framework that gold mining countries can apply to optimally harness their mineral resources for sustainable economic development.

Chapter 6

An Optimal Investment Strategy for Resource-Rich African Countries' Growth and Development

6.1 Introduction

This Chapter develops a Strategy termed '*Investment Framework for Resource-rich Africa's Development'* (IFRAD) for mining countries. In traditional policy formulation, there are elements which inform a policy or strategy, and critical instruments or implementation requirements essential for its realisation (Howlett, 2011; Haas, 1992). The Chapter focuses on the first part, which is the elements in the IFRAD Strategy, with Chapter Seven discussing the requirements, policy objectives and instruments for transitioning IFRAD. Based on the critical points in Chapter Five, the Chapter uses the checklist as a guide to assist in designing the central part of the IFRAD Strategy. The core SD investment principles by UNCTAD (2012) are incorporated in the discussions. These consist of eleven (11) core principles by (UNCTAD, 2015, 2012), which are necessary for greening investments in current development regimes (see *Table 6.1*).[49]

Table 6.1: Core SD Principles for Investments

UNCTAD Sustainable Development Principles for Investments	
1. Investment for sustainable development	7. Openness to investment
2. Policy coherence	8. Investment protection
3. Public governance and institutions	9. Investment promotion and facilitation
4. Dynamic policymaking	10. Corporate governance and responsibility
5. Balanced rights and obligations	11. International cooperation
6. Right to regulate	

Source: UNCTAD (2012; p.11)

[49] For clarity, Annex 6.1 illustrates in greater detail the core principles for sustainable investments.

The principles (outlined in *Table 6.1*) are further co-opted into an assessment tool comprising of an updated Competitive Investment Framework to assess the applicability of IFRAD to mineral economies in Africa.

As a caveat, investment strategies in mineral economies should be driven by the mining sector and integrated with industrial policy or national diversification Strategy to catalyse mining's linkages with the broader economy, in areas such as agriculture, manufacturing, and services.

Besides the dynamics in investment regimes, the political economy context of mining in relation to SED strategies must be understood. A feature of political economy analysis is the type of motivation that drives the behaviour of institutional and political actors.[50] For mining, powerful elites create extractive institutions that often weaken the governance structures necessary for growth.[51, 52] Thus, when designing strategies for mineral economies, the underlying political economy structures must be understood, including:

- The motivation of the economic system (or in policy making terms a conceptual framework),
- The elements, the types of institutions whether extractive or inclusive; and
- How the agents and actors influence and shape incentives for development.

The above points influence the pre-conditions, which enable the functioning of strategies, and the impact of the type of economic systems. As already established in Chapter Two, the *market system* is a better alternative for mineral economies since proponents of "smarter" regulation propose a mix of heavy state regulation with

[50] In terms of political economy, it is premised on institutions, formal and informal rules and the underlying political powers, bureaucratic agencies or social and private organizations (see p.4, Dimensions of Political Economy, World Bank, 2008).

[51] Dougherty (2013) expands on the impact of rent-seeking behaviour by junior Canadian gold miners operating in laxed mineral regimes.

[52] This is part of the mechanism that causes the RC Thesis (Isham, 2005). However, the chapter does not delve into this, it rather considers the elements needed for implementing IFRAD in mineral economies.

liberalisation (Gunningham *et al.*, 1998, cited in Howlett and Rayner, 2007). The recommendations highlighted in section 2.5.1 of Chapter Two are meant to improve the inefficiencies of the market system while providing avenues for securing welfares in mineral regimes in Africa.

Specifically, for the IFRAD Strategy, Chapter Two's recommendations are critical. These recommendations must form the basis or the underlying conceptual framework to drive SED strategies. *Figure 6.1* summarises the protocol for IFRAD. The focus of the figure is on investments, but the process is generally applicable to other SED Strategies.

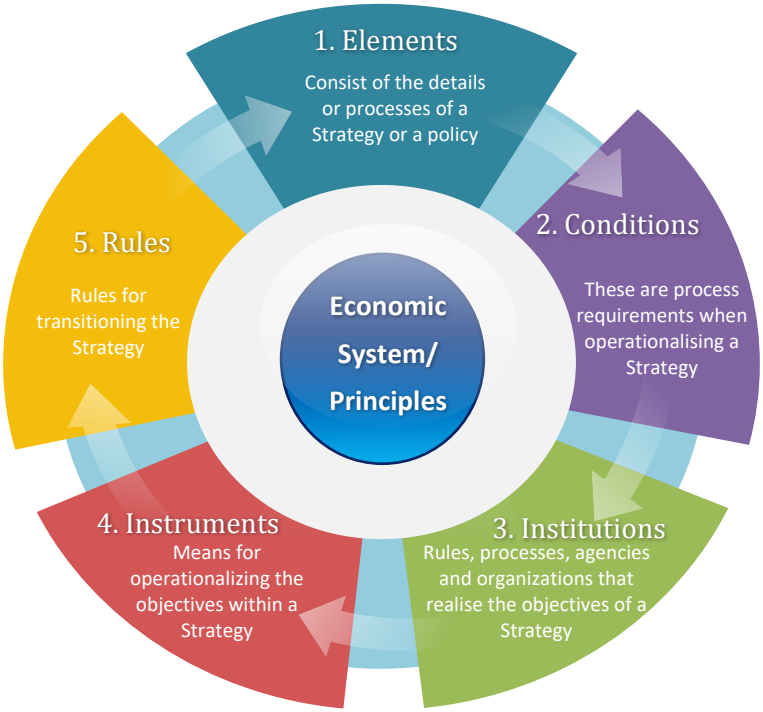


Figure 6.1: SED Protocol for Investment Strategies in Mineral Economies
Source: Researcher's Conceptualisation (2017)

Scholars such as Schouwstra and Ellman (2006); Howlett and Rayner (2007); and Candel and Biesbroek (2016) have concurred that the success of policy implementation or strategies is precedent on having a clearly defined objective within a system, conceptual framework and defining suitable instruments to achieve the set targets.

Here, the political economy dynamic dictates how effective the implementation requirements (instruments and the kinds of institutions) and rules will be in transitioning the IFRAD Strategy in mineral economies.

Drawing from *Figure 6.1*, the next section discusses the elements for IFRAD. Points 2- 5 in *Figure. 6.1* are considered under the implementation requirements and plan in Chapter Seven. The next section is guided by the following:

- The 'structure' consisting of elements, i.e. processes that must be present for the IFRAD Strategy to be transitioned;
- A 'how to' guide on implementation or points of strategic assessment. These are strategic questions that mineral regimes may have to answer through a thorough analysis of their regimes; and
- The assessment tool, which is designed based on the IFRAD Strategy. This is presented in section 6.3.

6.2 Elements of the Strategy

To provide a pathway for IFRAD, *Figure 6.2* illustrates the IFRAD process. It depicts an interactive five-step process for mineral economies to assess where they are and the enabling environment to implement the IFRAD Strategy.

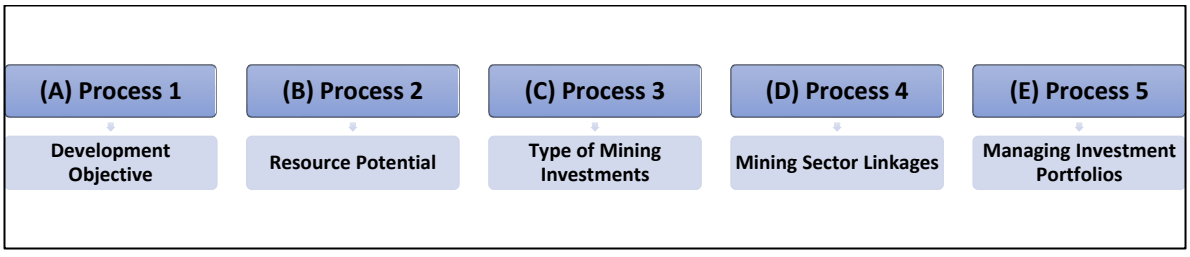


Figure 6.2: Graphic Showing the IFRAD Process

Source: Researcher's Conceptualisation (2017)

Figure 6.3 further expands the above *Processes (1- 5)* with a flowchart that describes the general structure and scheme for IFRAD.

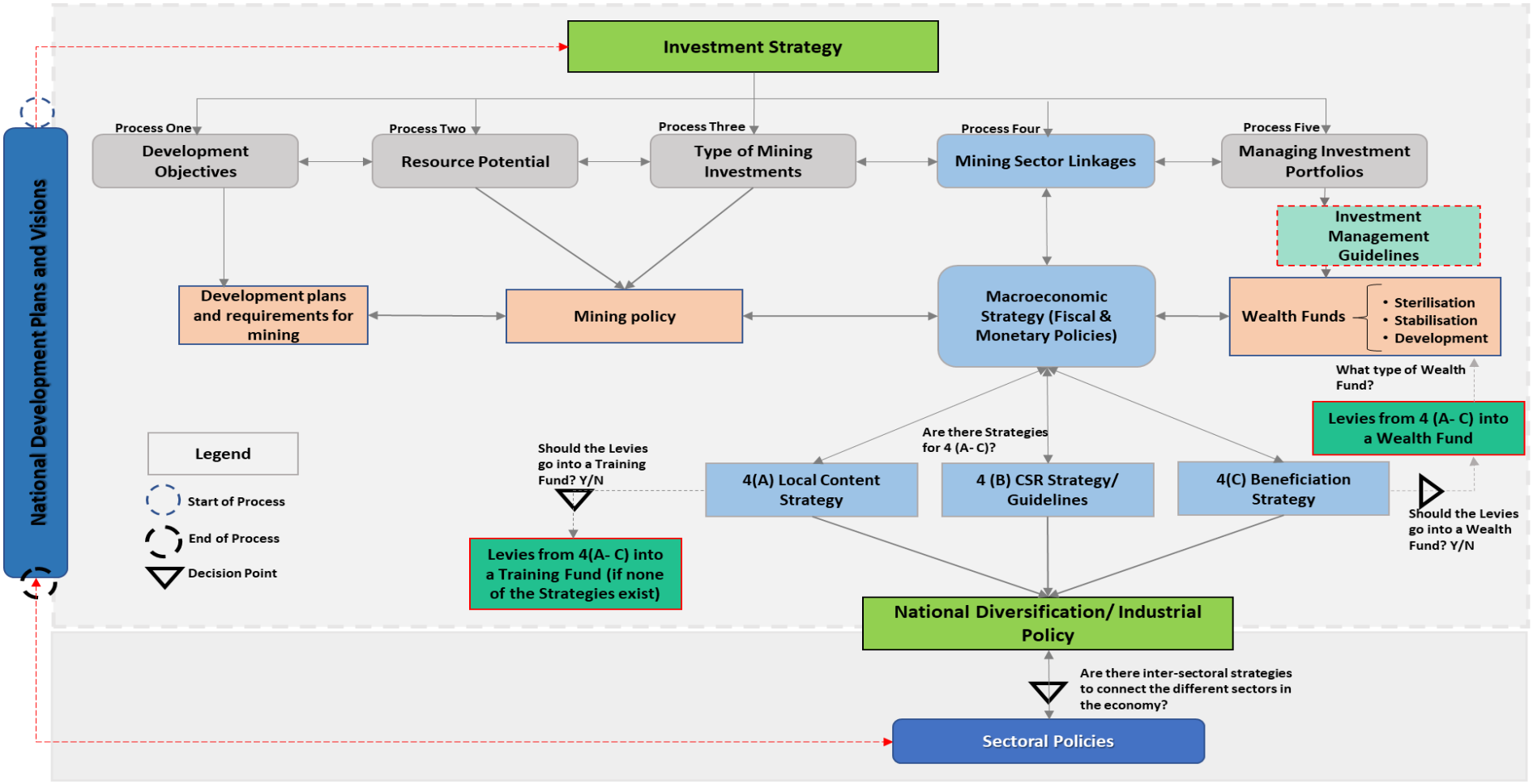


Figure 6.3: Structure and Scheme for IFRAD

Source: Researcher's Conceptualisation (2017)

From *Figure 6.3*, *Processes (1- 3)* must be clearly defined by the State. This is done usually through the national development plans (NDPs) and long-term development framework of a country. Under *Processes 2* and *3*, the mining policy objectives should be aligned to the national development plan or long-term vision of the country. Processes 1- 3 can set the scene for optimal resource development in light of a country's investment goals and its development Strategy.

The common checklist for an optimal mining investment environment in *Table 5.1* provides a further guide for *Processes (4- 5)*. Process 4 must be connected to a country's industrial policy to enhance the diversification of mining into other key sectors. There are decision points on the type of local content, CSR and beneficiation strategies, which must be instituted to obtain benefits and create linkages of the sector with other sectors of the economy. If any of the strategies are weak or non-existent, levies can be designed to tax mining companies, which then goes into supporting training and development and into a wealth fund. *Process 5* considers long-term investments into development and whether governments should set-up a wealth fund, but this will largely depend on how the fiscal and monetary policies are designed to counteract price volatility and meet the fund's objectives.

Based on the discussions of *Figure 6.3*, the next section discusses the IFRAD *Processes (1- 5)* in greater detail with the types of policy interventions and options needed for the growth and development of mineral economies.

6.2.1 Process 1: Mining with National Development Objectives

In *Process 1*, the express goal of the IFRAD Strategy must be aligned to the mineral economy's development objectives. In many parts of Africa, the environment for mining investment is not well integrated with the mining and political regimes' objectives (cited from Chapter Five of the Thesis, p.127- 128). Most mineral economies

have medium to long-term development plans that are neither frequently updated nor synchronised with its mining development plans/visions. However, the discovery of minerals should lead to analysis about:

- The needs of an economy and the expectation of what the mineral would be used to achieve;
- The strategic capacity, i.e. (skills, research and development and innovation) and abilities of the mineral economy to optimally exploit the ore-body;
- The (domestic) and regional market size, in terms of consumption capabilities from value added mineral products; and
- Finally, understanding the most efficient points in the mineral value chain where benefits (or rents) can be harnessed for the economy.

The above suggested critical points of analysis would have to be complemented by interventions in the African Mining Vision (AMV), which seeks *a "transparent, equitable and optimal exploitation of Africa's mineral resources to underpin broad-based sustainable growth and socio-economic development"* (AU, 2009, p.v).

The AMV represents an Africanized vision of the future of the continent. The dearth of documents and initiatives that the AMV inculcated in developing this vision suggest therefore a major proof of the initiative towards sustainable development. The key point of the AMV is to use mineral resources as a catalyst for broad-based growth and development by capitalising on the benefit of resource-based development strategies that have worked elsewhere, such as in Finland and Sweden. The essential thrust of the vision document is about the critical linkages with which mining can crucially play in an economy. The Action plan for the implementation of the AMV was drafted to facilitate the transitioning of the vision's objectives. Each pillar in the Action Plan enunciates all concerns in SD and is integrative; hence, it is useful in inter-linking all sectors within mining economies for harmonised development (see AU, 2009; ECA-AU, 2011).

Also, Africa's Agenda 2063, which is the central development blue print for Africa can complement the AMV in reassessing development visions and plans to be integrated with the goals of a mineral regime. Although *"...there is no such thing as a 'standard approach'...Policy options and recommendations must be country specific and must be adapted to the local economic, social and cultural environment"* (GTD, 2008; cited in Cawood, 2011). This can further be complemented with a plan of diversification away from minerals.

To ensure the right to self-determination of countries, right to development, and as well fulfil UNCTAD principles: 1- investments into SD; 2- policy coherence; 4- dynamism in policymaking and 6- State's right to regulate, new and emerging mineral economies should conduct a gap analysis of their regimes, wherein key developmental challenges are identified with proposed solutions together with mining's potential objectives. This is to ensure that the mining sector is well targeted and incorporated in the overall national development Strategy.[53,54]

Points of Strategic Assessment: What are the country's express development objectives as well as mining's (potential) objectives'? Have they been aligned and has mining been integrated into the national development and industrial policies and strategies of the country?

6.2.2 Process 2: Understanding Resource Potential of a Country

In terms of *Process 2*, countries must be strategic in obtaining reliable assessments about the quality, grade, tonnage, densities and characteristics of the mineral resource.

[53] It has been previously argued by Stites (2003) and others that the PRSPs is disconnected from mining because most of the PRSPs failed to acknowledge how mining would be used to transform developing economies (Cited in Pedro, 2004).

[54] Currently, countries like Botswana, Namibia and South Africa's National Development Plans take stock of how mining has transformed and continues to strategical inform development outcomes. Such frameworks can serve as a guide for countries wanting to integrate mining into their development frameworks.

Geological uncertainty magnifies the risk borne by the investor, and with limited information gathered by geological survey departments, the bargaining powers of governments for negotiations are usually reduced at the initial stages (AU, 2009).

According to the ECA-AU (2011) and African Minerals Development Centre- AMDC (2014)[55], governments lack enforceable arrangements for mining companies to deposit demonstrated and measured geological data with high (or reasonable) level of confidence of mineral orebodies with local geological departments.

As a general point of analysis in any mining investment Strategy, governments would have to:

- Invest and develop the capacity of their Geological and Survey Departments to be able to collect, analyse, update and store information on mineral data;
- Conduct, collect and assess regular data on minerals, in terms of classification (using either the JORC/ SAMREC[56] or the traditional McKelvey Mineral Information Methods) for minerals; and
- Make available open cadastre systems that readily provide information on mineral rights/ licences holders, and geological data on brown and green fields in a country.

If the above points are integrated into a country's mining development objective, it places the country in a better position to negotiate and influence the fiscal dispensation in Mining Development Agreements (MDAs) or mining agreements. Moreover, geological survey and mapping are capital intensive and governments in mineral economies may have to borrow from the capital markets (private development

[55] The AMDC is the main implementing arm of the African Mining Vision. It was created in 2011 to see to the monitoring and evaluation of the vision's directives amongst mineral economies in Africa.
[56] The JORC and SAMREC stands for (the Australasian Joint Ore Reserves Committee Code) and (the South African Code for the Reporting of Mineral Resources and Mineral Reserves) respectively.

financing), or alternatively, pursue joint venture partnerships with exploration companies to build the knowledge of the geological potential of the mineral economy.[57]

Points of Strategic Assessment: Is there a national inventory that maps the economic potential of the mineral resource? Have governments set targets on acquiring information on the demonstrated mineral resources that are within its' jurisdiction, and are there on-going projects (government-led, private exploration joint venture-ship with governments) and/or regional-based, aimed at building the geological information of mineral ore bodies in the country?

6.2.3 Process 3: Types of Mining Investments

Process 3 ties the quality of the mineral resource information available or the potential of the mineral resource (and identified reserves) to contribute to development with the type of mineral investments. In the third process, the host nation's investment needs and goals must drive the country to assess the nature of the resource potential. Often, if the geological information about the orebody is reliable and within reasonable to high-level confidence, with minimal economic, political and social risks; then governments can steer the mining investment negotiations in their favour (AMDC, 2014; Guj *et al.,* 2013).

Governments' role in setting appropriate investment targets and steering the course of the agreement is critical. Protecting property rights and enforcing laws are mandatory to reduce the economic and political risks associated with mineral regimes. Every country needs a legal system that is trusted by its people and institutions, which settle

[57] Often, the usual approach for business is for exploration companies to obtain exploration licence to conduct: geological survey and mapping, and metallurgical, economic viability, marketability, social and political assessment of the orebody. These companies in turn auction off their interest to seniors, or partner with senior MNCs to economically extract the mineral resource. Because geological surveys are under resourced and capacitated, they are unable to adequately negotiate better terms for geological data sharing with exploration and mining companies (see the Country Mining Vision, AMDC, 2014: p.79).

disputes transparently. Where property rights and credit are uncertain, property markets do not function, and investments get damaged. Markets can handle ordinary risks through insurance, however, governments must absorb extraordinary risks associated with resource nationalism issues in mining regimes (Guj *et al.,* 2013; E & Y, 2015).

Also, some of the core elements in typical BITs and IIAs would have to be minimised to enable the State's right to regulate (see Principle 6 of the UNCTAD principles) without undue influence by mining companies (UNCTAD, 2012).[58] The Model Mining Development Agreements (MMDAs)[59] can serve as a guide to investment negotiations. Often the stability clauses, (which must be decided between the State and the MNCs) pose a problem for countries wanting to use the model as a framework for negotiation since governments may not be adequately shielded in the negotiations. Nevertheless, the MMDAs can serve as an informative guide for emerging mineral economies.

For *Process 3*, it must uphold all 11 principles, particularly, 3 (sound public governance and institutions), 5 (balanced rights and obligations), 8 (investment protection) and 9 (investment promotion) of the core SD principles for investments. Here, two things are essential:

- Mining investments must inform SD through CSR guidelines established by the State; and
- Governments must aim for a reasonable balance between investment protection (reasonable and justifiable regulations) and investment promotion and facilitation.

[58] Bilateral Investment Treaties (BITs) and International Investment Agreement (IIAs) serve as a guarantee and protection for International Transnational Companies operating in countries. According to Mann (2008), approximately 25% of BITS are signed between developed and developing countries. In all cases, they serve as protection for investors, and sometimes afford special rights between States.

[59] The MMDAs per the International Bar Association- IBA (2012) is aimed at ensuring best practices in areas such as: security of tenure, macroeconomic management; legal and regulatory framework; grant of exploration and mining licences; community development; environmental protection; defined obligations and responsibilities of government and company; fiscal and taxation issues; infrastructure development and investor protection.

Besides attracting FDIs into mining, governments can either partner with foreign investors (as a joint venture) or run mining businesses (State-owned) with capital from development financiers or the capital markets. Debswana Mining Company is a good example of a joint venture between the Government of Botswana and De Beers Company. Although this is seldom the way mining businesses are conducted in Africa, for countries that have the capacity, sound institutions, knowledge and skills to run such venture-ship, it is a good option for consideration.

Furthermore, there are some countries that have established unique partnerships, such as Ghana (with its diamonds sector partnership with small-scale operators); and South Africa (which recently apportioned funds) to commence a State operated gold mine (see South Africa's National Development Plan; NPC- RSA, 2012; Republic of South Africa, 2011). All in all, such models are challenged by the influence of corruption and state capture; however, mineral economies will have to consider varied but strategic options when running mining businesses. Some policy requirements to overcome the influence of corruption noted (in Chapter Seven) would be critical to ensuring that such ventures are triumphant as successful mining enterprises for Africa's development.

Points of Strategic Assessment: What types of mineral investments exist and is the investment regime competitive? How are current mining investment *development* agreements structured? What new 'potential' and current risks have affected the regime and how has it affected mining investments?

6.2.4 Process 4: Mining Sector Linkages (Rent Generation, Capture and Management)

The checklist in Chapter Five is used to guide the discussions under *Process 4*. All the elements to be discussed under the three fundamentals of optimal mining (rent generation, rent capture and rent management) are illustrated in *Figure 6.4* for mining

sector linkages. These have been adapted from *Table 5.1* of Chapter Five. Since the IFRAD Strategy is aimed at macroeconomic level concerns, the microeconomic issues in *Table 5.1* have not been included in the discussions in this sub-section. The micro level issues remain at the firm level and hence require a firm level strategy for the extractive sector in mineral economies. All UNCTAD's SD Principles for investment are relevant for *Process 4*.

Figure 6.4 contextualises the key concerns in the three fundamentals of optimal mining.

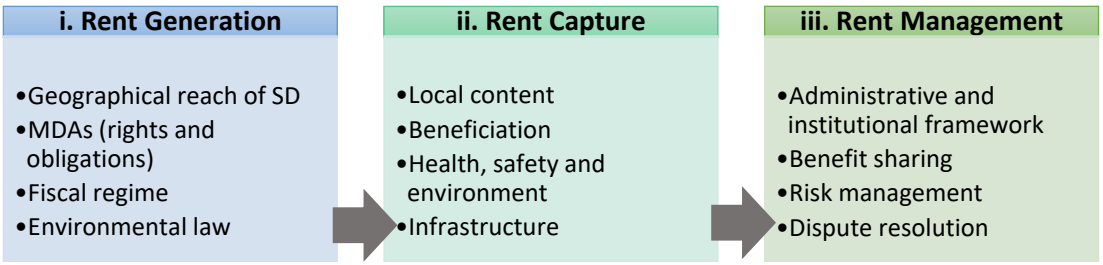


Figure 6.4: Optimal Mining Transmissions for Investment Strategies
Source: *Table 5.1*; Chapter Five

The issues (or concerns) regarding the three fundamentals of optimal mining for IFRAD are explained in the ensuing sub-sections.

i. Rent Generation

Geographical reach of SD

Due to the geographical reach of SD, SD goals and targets (commitments in JPOI, Agenda 21 and others) can form the basis for mining's sustainability through periodic national reviews of economic, sectoral and environmental policies. A key economic criterion for encouraging rent generation and meeting targets for FDI is to promote international and regional cooperation and coordination. This fits into principles 1

(investing for SD- (CSR)), and (8 and 9), which contend for a reasonable balancing between investment promotion and investor protection of interests.

MDAs (Rights and Obligations)

Additionally, at the rent generation stage, investment agreements are signed between the investor and the host nation. Thus, there is need for clarity on the obligations and responsibilities of each party in the MDAs. It is also at this stage that governments must address governance, capacity and infrastructure constraints that magnify the risks for mining investments. The actions required are rule of law, independent judiciary coupled with sound mining regulatory frameworks that are well integrated with the development policy/ vision of the country.

Fiscal Regime

Fiscal policy requirements are captured in the MMDAs (or MDAs) and are usually in accordance with the legal requirements (unless under a special regime). The instruments must be competitive and stable to encourage investments into the sector. To ensure a *balance* between the regime's requirements and how mineral rents are utilised, fiscal rules and monetary policies should be structured with a long-term outlook towards first, equitable sharing of rents, and second, the diversification of the sector by building critical linkages (up, down, side and lateral stream) within the mining economy. It has been acknowledged by Guj *et al.* (2013, p. vii); AMDC (2014); ECA-AU (2011) amongst others that most often, mining tax regimes have inadequate skills and insufficient frameworks instituted to monitor the compliance of tax payments by mining companies. The following are the rules of thumb under fiscal regime for policy-makers planning to implement investment strategies:

- Aim for dynamic fiscal instruments that accommodate the cyclical nature of mining rents (such as sliding scale, or self-adjustable instruments are preferable over fixed percentage rates);

- An understanding of how rents are generated within the value chain with adequate frameworks and models that can capture rent; and
- The administration system for tax collection and management should be skilled and capacitated to effectively collect rents.

Environmental Management

Including environmental due-diligence as a component of a mining investment strategy is critical for fulfilling SD ends. The externalities from mining require that at the 'rent generation' stage, environmental standards are laid out before extraction commences and for companies to have a dynamic perspective to implementing requirements on air quality, noise, land degradation, water quality and bio-diversity protection. Climate change and bio-diversity offsets are emerging issues of critical concern to mining. These remain an un-explored area in many mineral regimes in Africa. Governments in strategizing on investments may have to set-up working groups or commissions to discuss the impacts of bio-diversity offset and trading vis-à-vis government regulations. Also, environmental bonds set-up in escrows for remediation does require further discussions, and options of investing such funds into equity markets or asset portfolio management. Upon closure, the return on investments may be used for reparation and rehabilitation with the capital used in fulfilling other development obligations of the country.

ii. Rent Capture

Local Content

Local content strategies must be integral to any mining investment policy or strategy. This provides the foundation (basis) for the linkages of the sector with other sectors through skills and enterprise development, supply chain and procurement services within the mineral value chain. Most often, local content instruments are limited by few clauses or articles in mining laws without a thorough analysis of how minerals can

be leveraged for local economic development. Few countries in Africa, such as South Africa, Nigeria, Ghana, and Mozambique have specific local content strategies, policies (or charters) to build the capacity of their mining jurisdictions.

Also, mineral economies aiming to restructure their economies to benefit from mining investment must integrate their macro-fiscal frameworks with local content policies. Specifically, the following steps would be essential:

- Analysing the value chain to understand where rents can be maximally captured for the local economy; and
- developing the capacity of the local economy to provide the needed materials and services for mining;

Here, standards must be set for sourcing and local procurement in the economy with penal actions in the form of levies sanctioned on companies that do not procure materials and services locally. Ghana recently started levying gold mining companies that refuse to procure certain materials locally. These levies are then used to provide training and support for entrepreneurs in the mining supply chain. Alternatively, the levies can also be put into fund (as indicated in *Figure 6.3*).

Value Addition (Beneficiation)

Considerations for domestic beneficiation (or value addition) should be integral in any long-term strategy for investments. In instances where domestic value added mineral products are utilised (such that there is local market for the products), and the skills for value addition are available in the economy, governments can compel mining companies to provide beneficiated commodities for the local economy. Where governments may not have the capacity to task mining companies, there can be the introduction of a 'beneficiation' levy tied to the macro-fiscal frameworks for mine taxation. This is with the assumption that the core competencies and skills to facilitate beneficiation in an economy may be absent. An example of such approach, is South

Africa's new royalty regime, which penalizes companies (in the gold and PGM industry) that do not beneficiate their concentrates with higher royalty rates than companies that beneficiate (see Republic of South Africa, 2008, Mineral and Petroleum Resources Royalty Act 28).

Health, Safety and Environment (HSE)

Ensuring that companies follow due process concerning health and safety regulations and standards set by the State are critical to greening mining investments. Standards set by the State and with effective M & E mechanisms can remedy the environmental impacts of mineral extraction on the bio-sphere. Here, governments would have to set parameters for: frequent monitoring and evaluation for compliance based on the State's standards; coordinate with mining companies and other mining sector agencies, to ensure that HSE standards are aligned with national SD principles.[60]

iii. Rent Management

Administrative & Institutional Framework

The first four *Processes (1- 4),* including the discussions under this sub-section can only be effective with robust mineral sector governance and administration. Here, governments must encourage public accountability and transparency, promote stakeholder engagement and oversight through a cautious assertion of PSONR in their constitutions. States must also create advisory organs in mining agencies and departments, as well as their integration with environment, geology, mine health and safety, tax (revenue) services, etc.

[60] A good example here is the Mine Health and Safety Act of South Africa, which prescribes standards and critical guidelines on health and safety of the mining environment in open pit and underground mines.

Benefit Sharing

The above institutional set-up (or framework) should be tied with benefit sharing, in that, such frameworks facilitate the transparent and equitable disbursement of mining revenues. Usually, it is at the management stage that governments may decide on apportioning rents for future generations, stabilisation and long-term development. Mining businesses are essential to this process because by subscribing to international initiatives such as the IMF's Code of good practice on Fiscal Transparency, the World Bank's Assessments of Fiscal Transparency and the EITI, a company's revenue declarations (in the form of taxes and royalties) must be aligned to what governments' report. Thus, in implementing the IFRAD Strategy, there must be considerations of the effects of different tax instruments (as has been already suggested) on the nature of rents. Additionally, incentive structures (in the form tax breaks) should be given to mining companies when local content and CSR strategies have been wholly integrated into core mining operations. This may lead to firmer business relationships between the State and mining entities.

Risk Management

In terms of risk management and mitigation, the State may have to consider demand-driven approaches to minimizing risks, such as conducting mining explorations and assessments to determine economic feasibility of the resource endowment. Additionally, building capacity and enhancing mining skills development through initiatives for mining engineering education, technical and vocational training programmes in mining are needful. The physical infrastructure- transport, energy, financial and import or export facilities should be available and up to meaningful standards, to reduce the operational costs of the mining enterprise. Another factor in minimising risks is introducing fiscal transparency and clarity in the tenets of the

mining law. This removes doubts in the minds of investors, thus eliminating all obstacles to transparency during collection, flow and distribution of rents.

Dispute Resolution

Usually, when a means for dispute resolution is not expressly stated in a BIT or MDA, the de-facto option for resolution is arbitration through the International Convention on the Settlement of Investment Dispute (ICSID) or UNCITRAL arbitration rules. As governments become transparent with well-functioning rule of law, it has been suggested by Sauvant and Ortino (2013) that other openly transparent processes and courts within the regime be considered in developing countries to foster trust. It is important that *express* clauses on dispute resolution be indicated in the investment agreement to ensure clarity in the due-process when disputes arise.

Points of Strategic Assessment: Have effective safeguards been established in the legislative framework to support mining sector agencies? In terms of building critical mining sector linkages, is the economy's local content and CSR policies well integrated with its fiscal and industrial policies? Have governments been successful in managing various risks factors, which influence mining investments?

6.2.5 Process 5: Managing Investment Portfolios: Funds

In terms of managing investment portfolios, *Process 5* is a corollary of *rent management* under *Process 4*. A holistic investment strategy must consider the long-term potential of guaranteeing rents for future generations through development or stabilisation funds (or Sovereign Wealth Funds- SWFs). As argued by Pedro (2004), although most funds are applied to the oil and gas sector, the same approach of long-term sustainability (by saving into a fund) can be applied to minerals. A case in point is Botswana's Pula Fund, which was noted in Chapter Five (refer to page 125).

The fiscal aspects of mineral revenue management should lead to considerations of safeguarding portions of mineral rents into a fund to be managed by portfolio managers, or asset management firms in partnership with central banks or quasi-government bodies. Benefits of such funds include: stabilising tax revenues, supporting marginal mines, investment into future infrastructure development, exploration for mineral potential and/or development of mining technologies from the returns on the fund (Blundell-Wignall *et al.,* 2008; Caner and Grennes, 2010; van der Ploeg and Poelhekke, 2009).

According to Das *et al.* (2009), the first set of issues to decide on whether a country should set-up a SWF go beyond the nominal inflow of mining revenues for the State to "determine whether the country has an 'adequate' or 'optimal level' of international reserves". Even if the country has indeed ample enough reserves, policy-makers would have to decide whether or not they would use the SWFs to meet balance of payment needs (or savings for the long term). Should the idea of setting-up a fund be intended, then governments would have to consider a SWF in the context of:

- The operational objectives that would guide its funding, withdrawal and spending;
- The decision on the institutions that would guide the principles and objectives to regulate the funds - investment objectives, guidelines and risk tolerance; and
- What to invest in, i.e. the strategic asset allocation, usually determined by an investment policy (Ibid).

Sometimes the case for setting-up the fund is defeated when according to Triki and Faye (2011), African governments understandably keep spending from their funds due to development challenges. In so doing, this renders the funds useless for saving for future generations. However, that may be curbed by establishing 'fund' considerations such as:

- Defining the ‘criteria’ for depositing or withdrawing revenues. This can be linked to resource prices, total revenues or other macroeconomic considerations;
- Identifying the finite or intended optimal size of the ‘fund’; and
- Determining the legal status of the fund and concurrently, balancing between the fiscal rules and the discretion of the fund managers (van der Ploeg and Venables, 2011; Berg *et al.*, 2012).

Operating wealth funds must be tied with strong macroeconomic discipline, effective governance mechanisms, and firmer rules to guard what goes in and out of the fund. Apart from the wealth funds, governments may consider direct portfolio investments within (and outside) Africa where rents from mining can be managed by trusted entities who invest in (bonds, derivative markets- futures, and equities) in buoyant markets. This can increase intra and inter trade earnings within and outside of the continent and serve as a source of FDI inflows into the recipient countries.

Point of Strategic Assessment: Considering the current level of development of the economy, are there established transparent institutional processes and mechanisms to set-up a fund?

6.3 A Tool for Assessing IFRAD in Mineral Economies

The elements and the essential targets discussed in the IFRAD Strategy are converted into a tool for assessment. The purpose of the tool is to help evaluate each process within IFRAD and at which stage countries should implement the Strategy. Chapter Eight achieves this coupled with a SWOT analysis of the current state of the mining sectors in the case study countries used in the Thesis’ assessment. To streamline the economic and fiscal aspects of the IFRAD Strategy, the competitive investment framework (CIF) is incorporated into the tool for assessment. The CIF’s analysis can guide countries on how to implement IFRAD, and whether mineral regimes remain

competitive for implementation of the Strategy. The economic system's performance on sustainability in Chapter Four is included in the framework. Additionally, some of the elements under the social and environmental systems are also co-opted in the tool.

To ensure coherency of the tool with SD, the core principles for investments by UNCTAD (2012) are mapped against each process of IFRAD. Discussions on the selection of some of the performance indicators and targets can be found in Chapter Four (see Annexes 4.2- 4.5). *Table 6.2* presents the framework. This consists of a matrix of performance indicators and targets to shape the discussions on IFRAD in Chapter Eight.

Table 6.2: A Tool for IFRAD's Assessment in Mineral Economies in Africa

	IFRAD's Processes	Core Principles for SD Investment										Points of Strategic Assessment
		1. Investment for sustainable development	2. Policy coherence	3. Public governance and institutions	4. Dynamic policymaking	5. Balanced rights and obligations	6. States' right to regulate	7. Openness to investment	8. Investment protection	9. Investment promotion and facilitation	10. Corporate governance and responsibility	11. International cooperation	
1	**Development Objectives**												
	Integrated development plan/ Mineral development objective	✓	✓	✓	✓	✓	✓	✓	✓	✓			- What are the country's express development objectives as well as mining's (potential) objectives'? - Have they been aligned and have mining be integrated into the national development and industrial policies and strategies of the country?
2	**Resource Potential**												
	Knowledge of Mineral Reserves and Resources*	✓	✓	✓	✓	✓	✓	✓	✓	✓			- Is there a national inventory that maps the economic potential of the mineral resource? - Have governments set targets on acquiring information on the demonstrated mineral resources that is within its' jurisdiction? - Are there on-going projects (government led, private exploration (joint venture with governments) and or regional-based, aimed at building the geological information of mineral ore bodies in the country?

3	**Mining Investments**												
	MDAs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	- What types of mineral investments exist and is the investment regime competitive?
	Investment agreements and elements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	- How are current mining investment (development) agreements structured?
	Tax stability agreements (DTT)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	- What new (potential) and current risks have affected the regime and how has it affected mining investments?
4	**Mining Sector Linkages**												
	4a. Economic Aspects												
	Macroeconomic Stability*	✓	✓	✓	✓				✓	✓			
	Investments into Capital Development*	✓	✓	✓	✓								
	Resource Nationalism (RN) Issues*	✓	✓	✓	✓	✓	✓						- Have effective safeguards been established in the legislative framework to support mining sector agencies?
	Transparency and Management of Revenues*	✓	✓	✓	✓					✓			
	Sustainable Production*	✓	✓	✓	✓								
	4b. Fiscal Aspects (CIF)												
	Corporate tax rate (national)		✓				✓	✓	✓	✓			
	Branch office tax		✓				✓	✓	✓	✓			
	Income tax credits for foreigners		✓				✓	✓	✓	✓			
	Corporate tax on oil and gas		✓				✓	✓	✓	✓			
	Minimum corporate tax		✓				✓	✓	✓	✓			- How competitive is the current regime with other mineral regimes in Africa?
	Additional profits tax		✓				✓	✓	✓	✓			
	Tax holidays (years)		✓				✓	✓	✓	✓			
	Tax treaties		✓				✓	✓	✓	✓			
	Deduct exploration/development costs (years)		✓				✓	✓	✓	✓			

	Ring fencing		✓				✓	✓	✓	✓			
	Forward carry of losses (years)		✓				✓	✓	✓	✓			
	Backward carry of losses No Not allowed		✓				✓	✓	✓	✓			
	Maximum cost deduction		✓				✓	✓	✓	✓			
	Depreciation (years) 1–25 (LOM)		✓				✓	✓	✓	✓			
	Capital gains tax		✓				✓	✓	✓	✓			
	Tax on assets		✓				✓	✓	✓	✓			
	Value added/sales tax		✓				✓	✓	✓	✓			
	Fuel tax		✓				✓	✓	✓	✓			
	Repatriation/dividend/withholding tax		✓				✓	✓	✓	✓			
	Import duties		✓				✓	✓	✓	✓			- In terms of building critical mining sector linkages, is the economy's local content and CSR policies well integrated with its fiscal policy?
	Export duties		✓				✓	✓	✓	✓			
	Payroll tax		✓				✓	✓	✓	✓			
	Land tax		✓				✓	✓	✓	✓			
	Provincial (State)		✓				✓	✓	✓	✓			
	Municipal taxes		✓				✓	✓	✓	✓			
	Royalty Rate		✓				✓	✓	✓	✓			
	4c. Institutional Aspects												
	Agencies (Support Mining Investments)			✓		✓	✓		✓	✓	✓		
	Agencies (Monitoring and Compliance)			✓		✓	✓		✓	✓	✓		
	Agencies Responsible for Managing Mineral Revenues			✓		✓	✓		✓	✓	✓		
	4d. Social Aspects												
	Local Content*	✓	✓	✓	✓	✓	✓						
	CSR Policy and guidelines*	✓	✓	✓	✓	✓	✓				✓	✓	

	4e. Environmental Aspects												
	Environmental law and due diligence*	✓	✓	✓	✓	✓	✓				✓	✓	
	Health and Safety*	✓	✓	✓	✓	✓	✓				✓	✓	
	4f. Risks												
	Financial								✓	✓			- Have government been successful in managing various risks factors which influence mining investments?
	Economic								✓	✓			
	Country/ Regional (Sovereign)								✓	✓			
	Political								✓	✓			
5	**Managing Investment Portfolios**												
	(Wealth Funds) Investment*	✓	✓	✓	✓			✓	✓	✓	✓		- Considering the current level of development of the economy, are there established transparent institutional processes and mechanisms to set up a fund?
	Direct Investments	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Several sources: The *five Processes* of IFRAD; Chapter Four (Annexes 4.2- 4.5; 4.7- 4.9); UNCTAD (2012); and Cawood (1999)

*These items and the methodology for assessment are discussed in Chapter Four of this Thesis (see pages 72- 108).

6.4 Conclusion

In summary, the Chapter discussed the first part of the IFRAD Strategy. This was premised on earlier discussions in Chapter Five and the critical points that must be factored when designing investment strategies. The UNCTAD principles, which were pertinent for a new generation of investment policy issues were co-opted in the IFRAD Strategy, as well as the assessment tool for the SED of countries.

For the IFRAD Strategy, it should be noted that due to the unique challenges and constraints of countries, the approaches or options should be implemented based on the level (stage) of current development needs. Also, it is important to note that the processes are interactive and non-linear. Although, there are general fundamentals (such as *Processes 1- 4*) which are essential for all mineral economies, conducting a situational analysis in line with a nations' development and mineral investment goals can direct the resource development pathway that a mining country should pursue. The *Table 6.2* will provide a useful tool for countries in guiding the development of optimal mining investment policies for growth and development.

The next Chapter discusses the policy instruments, requirements and plan for implementing IFRAD in mining countries.

Chapter 7

Implementation Plan for the IFRAD Strategy in Mineral Economies in Africa

7.1 Introduction

This Chapter presents the plan for implementing the IFRAD Strategy. It discusses the requirements and policy instruments necessary in realising the five processes within IFRAD. Following Tinbergen's rule that at least every policy or strategy (and its element) must be tied to an instrument, some of the fundamentals of policy making vis-à-vis the unique context of mineral-rich economies are expounded (see Tinbergen, 1952). Instead of the 'one' policy instrument per a policy process (according to the Tinbergen rule), varied instruments are provided for each process of the IFRAD Strategy.

One of the main reasons for this Chapter has been the challenge of translating policies or laws in developing mineral economies. Implementation deficiencies arise as a result of a lack of understanding (or capacity) to fully implement policies, and the vested interests of political and institutional actors who influence the policy-making process in their favour. For mineral economies, it is imperative for policy-makers to understand the nature of rents and rent capture instruments that impact economic growth, and the pre-conditions (or success factors), which enhance effective implementation of policies in the African context.

7.2 Plan of Implementation for the IFRAD Strategy in Africa

In terms of implementing IFRAD, *Figure 7.1* expands on (2- 5) of the SED protocol in Chapter Six (see *Figure 6.1*). The conditions are grouped under *requirements* for

IFRAD; and the instruments and rules under *policy objectives*; and finally, a '*how to guide'* for implementation.

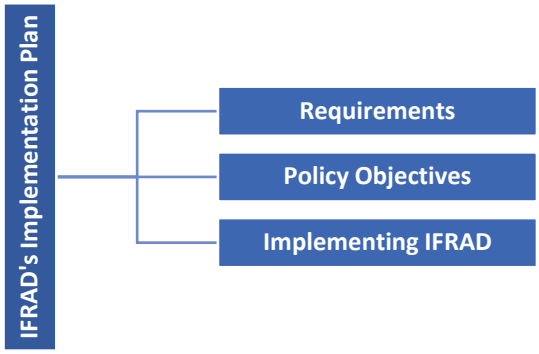


Figure 7.1: Outline for IFRAD's Implementation in Africa
Source: Researcher's Conceptualization (2017)

7.2.1 Requirements for IFRAD's Implementation

As indicated, to get 'implementation' right there must be a sound understanding of the mineral investment environment and the interests of the institutional actors who implement policies in RRA economies. Schouwstra and Ellman (2006) have asserted that certain pre-conditions or requirements are 'essentials' without which a policy or strategy may fall apart. For the IFRAD Strategy, 12 essential requirements are gleaned from Africa's regional frameworks on mineral sector governance, as well as some of the recommendations from Chapter Two's discussions (see also AMDC, 2014, 2012; AU, 2009; ECA, 2011a; ECA-AU, 2011; ECA-AU-AfDB, 2012). These represent general pre-conditions without which IFRAD may be flawed in implementation. The key requirements for IFRAD are presented as follows:

Requirement One: Understanding Rents and Taxation

Dougherty (2013) remarked that the notion of rents is central to understanding the structure of the mining industry. He indicated that rents are surplus profits beyond the amount necessary to sustain production. Or, that portion of value added that exceeds opportunity costs of all factors of production (Ricardo, 1817). Undoubtedly, the

options here for technocrats in governments are to introduce tax instruments that self-adjust in periods of down-turn and plenty; and to identify instruments that contextualise the political, socio-cultural and institutional issues in mining to help capture the indirect forms of rents during good times and provide relief during bad-times. For IFRAD's implementation, designing courses that take cognisance of the nature of rents and the instruments to adequately capture rents is a key requirement for implementing the Strategy.

Requirement Two: Governance and the State's Role in Mineral Economies

Good governance and the role of the State in steering the course of a mineral-led development are essential to fully implementing IFRAD in mineral economies. Regional frameworks such as the AMV, Agenda 2063, African Peer Review Mechanism and other regional accountability frameworks uphold the importance of governance and the effective role of the State in realising the priorities for economic development (see Dougherty, 2011 and AU, 2009). Thus, the State must ensure that rules for good governance in the economy are upheld and effectively steer mineral development for sustainable and inclusive growth. As an addendum to requirement two, a State must establish an extractive sector policy to mainstream IFRAD. Here, the rights, duties and responsibilities of all stakeholders must be clearly defined within the extractive sector policy, as well as the enabling social, economic and environmental obligations of governments and mining companies toward the goal of SED in mineral economies.

Requirement Three: Security of Tenure and Private Property Rights

Land security (tenure) and the enabling framework for mineral and private property rights are 'key' requirements, which must exist for IFRAD to be effectively implemented. Although security of tenure has moved from amongst the top ten mining risks from 2008, it provides a clear indication of whether the mining regime is stable.

Mining Companies (or investors) rely on the stability of the regime and use this requirement as a *litmus* test for whether political risks are heightened in the country (FI, 2016). Here, legislative frameworks must clearly define the mineral rights holders' interests, terms, duration and processes for renewal in the mineral regime (see IISD, 2012; Mann *et al.*, 2012).

Requirement Four: Requisite Human Capital for Mining

The skills-set of the labour force, i.e. the required human capital for mining is paramount to how meaningful IFRAD can be transitioned in an economy. As a requirement, it is imperative for expert technical and administrative capacity to be developed by the State together with other stakeholders, coupled with harnessing better partnerships between research think-tanks, academic institutions and industry to ensure effective extraction and management of mineral resources in an economy (refer to AU, 2009).

Requirement Five: Public and Private Partnerships

The fifth requirement, which is tied to the fourth under the IFRAD Strategy is the needed critical partnerships between public and private institutions. Governments should have productive partnerships and collaboration with industry, academic and research institutions engaged in mining to ensure that the physical needs of industry can be met through research and development, while providing the enabling policy environment to promote mineral development in a country.

Requirement Six: Investment Incentives

Another requirement of relevance to IFRAD is the type of investment incentives that governments can provide to boost the mineral investment potential of the State. Here, careful application of fiscal incentives such as tax breaks, exemptions to export and import duties, and providing further incentives for MNCs to move beyond compliance

of local content and CSR obligations must be instituted by the State (refer to UNCTAD, 2012, 2015, n.d. on designing investment policies).

Requirement Seven: Technology and Intellectual Property (IP) Rights

The seventh requirement for IFRAD is the enabling legal environment to support mining technology and IP Rights for innovation (UNCTAD, 2012; 2015). This requirement is necessary to ensure that the laws of the country are favourable in protecting technology and IP rights. Also, technology transfer agreements and use of foreign technologies in business should be established and monitored through regulatory bodies in partnership with mining companies and support service companies in mining.

Requirement Eight: Inclusive Institutions

For the IFRAD Strategy, institutions that foster inclusivity and policy coherence for the development of the mineral economy are needed. For this eighth requirement, it is important that multi-stakeholder partnerships are established and consensus on policy decisions amongst mineral governance agencies achieved. For mining to be beneficial, institutions, defined here as formal and informal rules underlying political powers, bureaucratic agencies or social and private organizations must work cohesively (see ECA, 2012b and World Bank, 2008). Here, the organisational structures for ministries, agencies, and departments concerned with mining should be designed, together with advisory councils who work to enhance the needed synergies between development agencies and mining-related institutions in their decision-making.

A network chart for building synergies and fostering networks amongst mining sector agencies is illustrated in *Figure 7.2*.

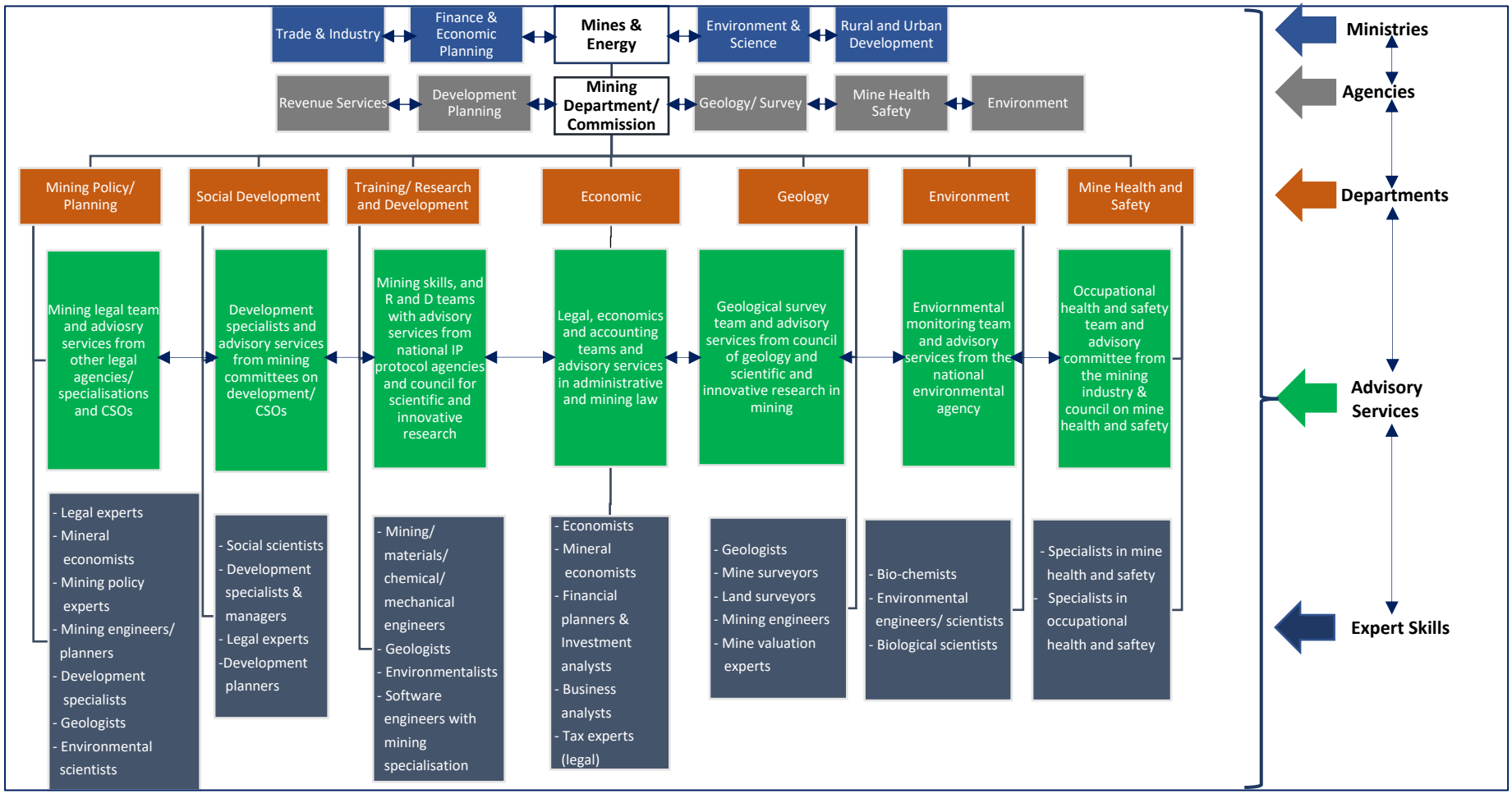


Figure 7.2: Mining Institutions Network Chart for Policy Design

Source: Researcher's Conceptualisation (2017)

The network chart shows the institutions, policy and institutional actors in a typical mining economy with environment and social development agencies and actors. To harness effective partnerships, governments must design protocols for horizontal and vertical communication, as well as create advisory councils who coordinate and synchronise the interest and goals within the various departments.

Requirement Nine: Natural Justice and Righteousness

The ninth requirement essential for IFRAD is for mineral economies to implement principles of righteousness and natural justice in matters of dispute settlement and adjudication arising from mineral revenue management. Here the three principles of natural justice, i.e. the right to be heard through fair hearings; biased free ruling and judgment based on robust evidence in adjudication and in the court system must be clearly entrenched in a country's legal framework to protect the integrity of the mineral regime to attract mining investments (refer to Craig, 2008).

Requirement Ten: Regulations for Environmental Protection

The tenth requirement for IFRAD is for mineral economies to ensure that measures for environmental protection are contextualised and clearly defined in the regime (Sinkala, 2009). The regime should encourage dynamic regulations, where globally but relevant national standards, which are applicable to the regime are developed. Also, the available skills-set and capacity for monitoring compliance should be in existence or developed to safeguard the environment (Ibid).

Requirement Eleven: Infrastructure for Mineral Development

The critical infrastructure for mineral development is a key requirement to realising the IFRAD Strategy in mineral economies. As a requirement, governments should partner with private developers and develop essential transportation networks, mining infrastructure and guaranteed source of energy supply to meet the mining economy's needs. This enhances the country's bargaining power and position to be able to provide

the right kinds of incentives for the investor in investment negotiations and agreement (see ECA, 2015, 2016b; ECA-AU, 2011).[61]

Requirement Twelve: Defining the Level of Mineral Development

Since no two mines and mining investment destinations are the same, purely based on translating the IFRAD Strategy, a classification scheme is essential to determine the level of mineral development. Based on several parameters (refer to *Table 7.1*), countries are classified as - emerging mineral economies, semi-matured mineral economies and matured mineral economies to assist in devising ways in which IFRAD may be implemented in a mining country and the type of policy instruments required.

The above requirements are not exhaustive since for many mineral economies, the social-cultural environment, the type of incentives, the nature of the elites in a country, the type of institutions- rule of law, democracy, etc., affect the different policy manifestations in mining. Therefore, these 12 requirements only represent the necessary pre-conditions that are crucial for the success of SED strategies generally; and as well represent essential requirements for IFRAD's implementation. The next section considers the policy objectives and instruments for realising the IFRAD strategy.

7.2.2 Policy Objectives for the IFRAD Strategy

The second part of the plan of implementation is to understand the policy objectives and instrument mixes needed for IFRAD's implementation. Essentially, policy

[61] Another dimension to investments in infrastructure, is the regional integration approach where smaller countries in partnership with other countries in a region can develop the requisite regional infrastructure to support mining in the region (see AU, 2009). This also enhances regional value chains and markets (AU, 2015a). The AMV has advocated for sub-regional infrastructure development amongst countries (AU, 2009, p. 25- 26, 44- 45). Spatial development programmes can lessen the cost burden of infrastructure development by small countries that are needful of rents (Ibid).

instruments are the techniques or means through which governments achieve their policy objective or strategic goals (Linder and Peters, 1990; Vedung, 1998). These must be linked to the broader agenda or goal of the economy (Howlett, 2001). Since the focus of the section is on policy objectives and instrument choices, the two main types, i.e. the substantive (legal, economic and social) and the procedural instruments, which consists of (institutional and informational instruments) are discussed under each policy objective for IFRAD. (see Bemelmans-Videc *et al.*, 2003; Howlett, 2011; on the types of policy instruments in policy-making). There are essentially four policy objectives for IFRAD's implementation. These are outlined below and accompanied by the requisite policy instruments for implementation.

Policy Objective One: Rule of Law

For this objective, the legal instruments are a mix of policy instruments of laws, standards and frameworks that contractually bind parties. Under *Process 1* (refer to Chapter Six and *Table 7.2*), the instruments consist of appropriate standards for the development of the mineral economy. *Process 2* is on the legal requirements for exploration, and the requirements for reporting on the geological information and standards. *Process 3* considers the framework or instruments for investment treaties and agreements. *Process 4* consists of laying the legal foundation and instruments for local content, CSR, fiscal rules and domestic beneficiation. The last, *Process 5*, suggests instruments for establishing a fund mechanism.

Policy Objective Two: Economic Growth

These instruments consist of specific pecuniary incentive or disincentive to support social, environmental and economic interventions in a mining economy (see Borrás and Edquist, 2013). *Processes 1- 5* consist of: instruments that contextualise mining with the economy's development objectives; controls for integrated mine development; trade and investment agreements; economic aspects of mine

management; and mobilising investments for SD through rent management respectively.

Policy Objective Three: Equitable Distribution of Wealth

Instruments like these emphasize the obligations for social due diligence including HSE in mining. The instruments for the five processes in the IFRAD Strategy consist of: (1) mobilizing investments for SD; (2) social issues in relation to exploration; (3) supporting mining R & D and social investments; (4) integrated mine development with emphasis on fulfilling the requirements of LC and CSR instruments and downstream processing; and (5) compliance and reporting on accounting rules and management systems for rent.

Policy Objective Four: Good governance and Institutions

A key instrument of any Strategy is the institutional elements such as the actors, administration and agencies in translating the Strategy. For the institutional instruments for IFRAD, they consist of M & E frameworks, establishing agencies and centres to ensure compliance on the legal, social and economic instruments (which in most cases are already in existence). Additionally, establishing training, and R & D centres for building the industry's capacity to monitor mining's impact. The list of specific instrument mixes for IFRAD's five processes are presented in *Table 7.2.*

In terms of the policy instrument mixes, comprehending the constraints and impediments can assist in selecting an optimal policy mix for any Strategy. Gibson (1999); Grabosky (1995); and Howlett (2004) have argued that certain combination of policy mixes affects the calculus of the instrument choice. Whereas in certain cases (i.e. multi-dimensional issues), this might augur well, in others, the configuration might change the outcome.

For mineral economies, the complexity and multidimensionality of mining issues require varied mixes, which support SED of mineral economies. More so, to deal with varied instrument mixes, as was indicated, identifying the level of mineral development is important to allow the different levels of mining countries to maximise on certain instruments when implementing IFRAD. *Table 7.1* illustrates the characteristics and definition of the classified levels of mineral development, and the rationale behind the classification. This classification facilitates the meeting of requirement 'twelve' for IFRAD.

Table 7.1: Classification of Mineral Economies for the Strategy

Classification	Definition	Characteristics of Maturity
Emerging Mineral Economies	Emerging mineral economies are countries that have recently discovered minerals (i.e. in the last 5-20 years) and are in the process of restructuring their political and economic frameworks to attract investments.	• Number of years in mining • Existence and implementation of mining frameworks • Mining's impact on economic growth • Integration of mining with local economy
Semi-matured Mineral Economies	Economies that have an average level mining experience and in mineral development; and (usually commenced) large scale mineral production within the last 50 years.	
Matured Mineral Economies	Matured mineral economies represent economies that discovered minerals (resources) in the past 50-100 years (or more) and have had sound mining laws integrated with the political economic dynamics of the country.	

Source: Researcher's Conceptualisation (2017)

The classification of the levels of mineral development is based on: length of mineral discovery; number of years spent on developing the resource and length of existence of its mining frameworks *vis-à-vis* the mineral resource; mining's impact on economic growth; and integration of mining with the local economy (see *Table 7.1*).

In summary, policy instruments, which operationalise an objective are ineffective unless the administrators and politicians expand the menu of government choices to include both substantive and procedural instruments, and to understand the important context-based nature of instrument choices (Howlett, 2011). This is a critical point

since mining is a unique economic activity that requires adopting an optimal mix of instruments for implementing SED strategies. Thus, skilled administration that understands how mining works is crucial to ensuring that IFRAD and other SED strategies work effectively.

7.2.3 Implementing the IFRAD Strategy for Sustainable Economic Development

Considering the key requirements and policy objectives for IFRAD, how should SED be assessed for IFRAD's implementation? *Figure 7.3* puts into context the '*how to guide'* for IFRAD's implementation.

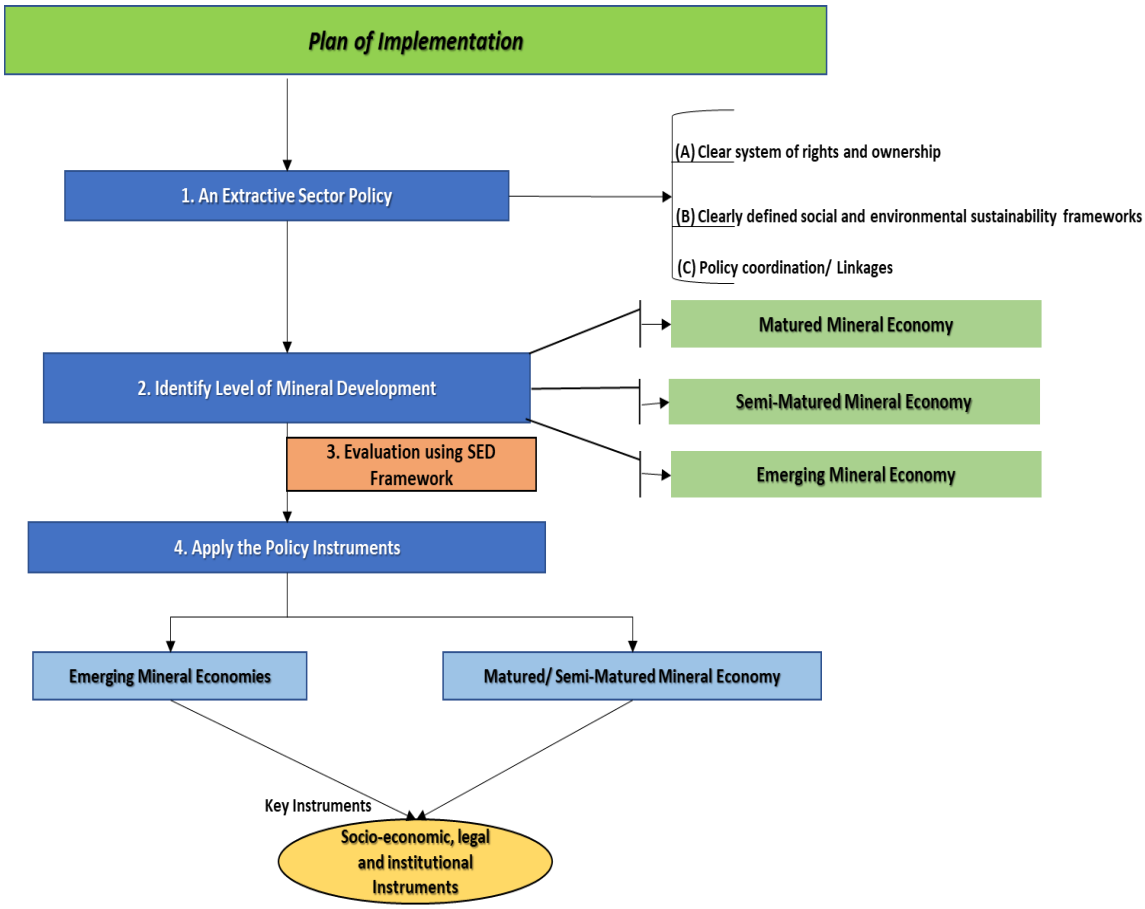


Figure 7.3: A 'how to Guide' on Implementing IFRAD in RRA Economies

Source: Researcher's Conceptualisation (2017)

The primary step is to draw on the requirements by developing a dynamic extractive sector policy, which capitalises on the processes and instruments for IFRAD at the national level. The second step is to use the classification scheme to measure the different levels of mineral development and the optimal mix of policy instruments required for IFRAD.

Before applying and monitoring IFRAD, the third step (see *Figure 7.3*) is to evaluate its application to a mineral economy's unique context. Here, IFRAD's assessment tool (in Chapter Six) is very important to assist countries in monitoring their progress on SED. What is also important is identifying the level of mineral development, at which stage of the IFRAD process a mineral economy is at, and to define the type of policy instruments needed for each RRA economy.

With regards to the fourth step, which is applying the policy instruments, the requirements for IFRAD must be fully met in every mineral economy. This is important because the policy instruments require a varied mix of instruments specific to each of the three classifications of mineral development. The rationale is that some countries have stable and robust regimes and have been mining for longer, thus, certain instruments may have already been established. In such cases, some of the policy instruments within the processes of IFRAD can be avoided, while focusing on implementing the ones that are absent or needed in a country.

Based on the Researcher's assessment of the policy objectives, *Table 7.2* prioritises the instrument mixes for the three classifications for IFRAD. Emerging mineral economies' instrument mix are devoid of domestic beneficiation regulation initially, because it requires strategic skills and long-term planning based on the local climate for manufactured mineral products. A fund mechanism for future development is also

not recommended in the initial policy mix until such countries mature in the management of mining revenues.

For semi-matured economies, because they have characteristics similar to matured economies, the recommended instrument mixes are integrated. Generally, the drive to prioritising certain instrument mix over others should be based on the economies' long-term development objectives and how such countries aim to use mining to transform their mineral economies (see *Table 7.2* for IFRAD's instrument mixes).

Table 7.2: IFRAD's Mix of Instruments for Mineral Economies

Classification of Mineral Economies	Instruments	The Five Processes of the IFRAD Strategy				
		Process 1	**Process 2**	**Process 3**	**Process 4**	**Process 5**
		Mining with development objectives	**Understanding the resource potential**	**Mining investment types**	**Mining sector linkages**	**Managing investment portfolios**
Emerging Mineral Economy	**Legal/ Regulatory Instruments**	- International (soft) law - Trade and tariff policy - Competition policies - Appropriate ASM rules - Good governance & equity - Transparency, especially for revenues	- Encourage exploration - Compliance and reporting: Rules/codes on the reporting of Resources	- Encourage exploration - Compliance and reporting - Good governance - Transparency, especially for revenues - Favourable standards and elements in investment treaties/ agreements	- Appropriate ASM rules - Environmental management - Social responsibilities - Compliance and reporting - Good governance - Transparency, especially for revenues - Fiscal rules	- Good governance - Transparency, especially for revenues - Compliance and reporting
	Economic/ Financial Instruments	- International (soft) law - Mobilizing investment to contribute to SD - Appropriate ASM rules	- Encourage exploration and mine development - Mobilizing investment to contribute to SD - Integrated mine development (database/ open cadastre system) - Prolonging mine lives	- Trade and tariff policy - Competition policies - Mobilizing investment to contribute to SD - Encourage exploration - Compliance and reporting: Accounting rules	- Integrated mine development - Prolonging mine lives - Compliance and reporting - Royalties, taxes, levies and rents - CSR/ local content and local participation - Enterprise development	- Mobilizing investment to contribute to SD - Accounting rules - Good governance - Transparency, especially for revenues - Risk management
	Social Instruments	- Mobilizing investment to contribute to SD - Prolonging mine lives - Environmental management - Social responsibilities	- Government capacity to develop policy and enforce rules, i.e. Competent administration - Prolonging mine lives	- Mobilizing investment to contribute to SD - Government capacity to develop policy and enforce rules, i.e. Competent administration	- Government's capacity to develop policy and enforce rules, i.e. Competent administration - Integrated mine development - Prolonging mine lives - Appropriate ASM rules - HSE rules - Social responsibilities	- Mobilizing investment to contribute to SD - Compliance and reporting - Good governance - Transparency, especially for revenues

	Institutional Instruments	- Ensuring relevance and effectiveness of mining - M & E - Good governance - Transparency, especially for revenues	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues - Training and research centres on Mining - Institutions for mining sector governance	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues - Fund management and administration
Classification	**Instruments**	**Process 1**	**Process 2**	**Process 3**	**Process 4**	**Process 5**
Semi-matured and Matured Mineral Economies	**Legal/ Regulatory Instruments**	- Enter into long-term supply contracts - Recycling policy - International (soft) law - Trade and tariff policy - Competition policies - Appropriate ASM rules - Good governance & equity - Transparency, especially for revenues	- Encourage exploration - Compliance and reporting: Rules/codes on the reporting of Resources	- Encourage exploration - Compliance and reporting - Good governance - Transparency, especially for revenues - Favourable standards and elements in investment treaties/ agreements	- Appropriate ASM rules - Realistic downstream processing requirements - Environmental management - Social responsibilities - Compliance and reporting - Good governance - Transparency, especially for revenues - Fiscal rules	- Act to regulate the management of the fund - Compliance and reporting - Good governance - Transparency, especially for revenues
	Economic/ Financial Instruments	- Encourage domestic supply through NMP - Enter into long-term supply contracts - International (soft) law - Mobilizing investment to contribute to SD - Appropriate ASM rules	- Encourage exploration and mine development - Own/control/promote mines - Mobilizing investment to contribute to SD - Integrated mine development (database/ open cadastre system) - Prolonging mine lives	- Bilateral or multilateral agreements - Trade and tariff policy - Competition policies - Mobilizing investment to contribute to SD - Encourage exploration - Compliance and reporting: Accounting rules	- Integrated mine development - Prolonging mine lives - Realistic downstream processing requirements (beneficiation) - Compliance and reporting - Royalties, taxes, levies and rents - CSR/ local content and local participation - Enterprise development	- Mobilizing investment to contribute to SD - Accounting rules - Good governance - Transparency, especially for revenues - Risk management

	Social Instruments	- Mobilizing investment to contribute to SD - Prolonging mine lives - Environmental management - Social responsibilities	- Mobilizing investment to contribute to SD - Government capacity to develop policy and enforce rules, i.e. Competent administration - Integrated mine development - Prolonging mine lives - Encourage exploration	- Support R&D to promote substitution - Mobilizing investment to contribute to SD - Government capacity to develop policy and enforce rules, i.e. Competent administration	- Government capacity to develop policy and enforce rules, i.e. Competent administration - Integrated mine development - Prolonging mine lives - Encourage exploration - Appropriate ASM rules - Realistic downstream processing requirements - Environmental management and health and safety - Social responsibilities - Compliance and reporting	- Mobilizing investment to contribute to SD - Compliance and reporting - Good governance - Transparency, especially for revenues
	Institutional Instruments	- Ensuring relevance and effectiveness - M & E - Good governance - Transparency, especially for revenues	- Ensuring relevance and effectiveness - Compliance and reporting - Good governance - Transparency, especially for revenues - Research and development centres & STI centres - Mining database system	- Ensuring relevance and effectiveness - Compliance and reporting - Good governance - Transparency, especially for revenues	- Ensuring relevance and effectiveness - Compliance and reporting - Good governance - Transparency, especially for revenues - Training and research centres on Mining - Institutions for mining sector governance	- Ensuring relevance and effectiveness - Compliance and reporting - Good governance - Transparency, especially for revenues - Fund management and administration

Source: The Instruments under each *Process* are derived from the Researcher's assessment of the policy objectives for the IFRAD Strategy

Some of the instruments (in *Table 7.2*) are cross-cutting because of the multi-dimensional nature of mining and SED. As such, where there are duplications under the five processes, countries implementing IFRAD should consider only the most relevant instruments, which suit their context. Also, it is important to reiterate that the consideration for the extractive sector policy must be subject to a well-functioning mining administration system that subjects its officials to the rule of law and accountability in the regime.

Additionally, the role and boundaries of the legislator, agencies and political agents should be clearly defined within the purview of effective governance institutions, equipped with sufficient resources to achieve the desired policy objectives and outcomes. Every citizen in a mineral economy should have within their purview and on-demand the measurement process for compliance, the reporting tools, annual reports on programmes and projects by MNCs, and the development agreements signed between governments and industry for scrutiny (see Cawood, 2011: p.12).

7.3 Conclusion

In conclusion, the Chapter discussed the implementation plan, i.e. key requirements that policy-makers must understand; the policy instruments for implementing IFRAD; and a 'how to guide' on implementation. The economic concept of rents was included as a requirement to shed light on the impact of rents and the policy options that are needed if IFRAD is to be implemented. Although these general requirements are pre-requisite for effective implementation of the IFRAD Strategy, they remain generally important in fulfilling the goals of mining-led development strategies in Africa.

Furthermore, considering the spate of R & D in mechanised mining and automation, it is a pre-requirement for countries to start envisioning a digital mining economy

where machines run the entire mining process from extraction to refinement. In this regard, what plans, and visions are being laid out at the national and regional levels for the future of mining in Africa.

The next Chapter considers the four selected gold mining countries and evaluates their preparedness to implement IFRAD. Due to the nature and extent of the assessment, brief recommendations for the different processes of IFRAD are provided, together with discussions on the applications of the Strategy in the countries.

Chapter 8

An Evaluation of the IFRAD Strategy in the Case Study Countries

8.1 Introduction

The Chapter's objective is to conduct an evaluation of the IFRAD Strategy in the selected case study countries- Ghana, DRC, Tanzania and South Africa. This is achieved by evaluating the countries using the SED tool devised from the Strategy, and a SWOT analysis of the selected countries' mining sectors. In terms of the SWOT, Johnson *et al.* (2008) have contended that such analysis helps in strategic planning and assessment of current situations and how to improve options for a firm (or an industry) and policy planning (refer also to Humphrey, 1986).

Chapter Seven outlined the implementation plan for the Strategy. In this Chapter, specific policy recommendations in improving the mining investment environment and applying the Strategy are deduced for each country. Lessons and schematics for applying the Strategy and the type of policy instruments required are exemplified with a map highlighting the gaps, and which processes need strengthening in each country. All in all, the Chapter's assessment will assist in identifying potential bottlenecks to assist IFRAD's implementation. Due to the nature of the assessments for the four countries, the Chapter relies heavily on annexes to cover all the stages of the evaluation highlighted (see *Figure 8.1* for the steps to be covered in the Chapter).

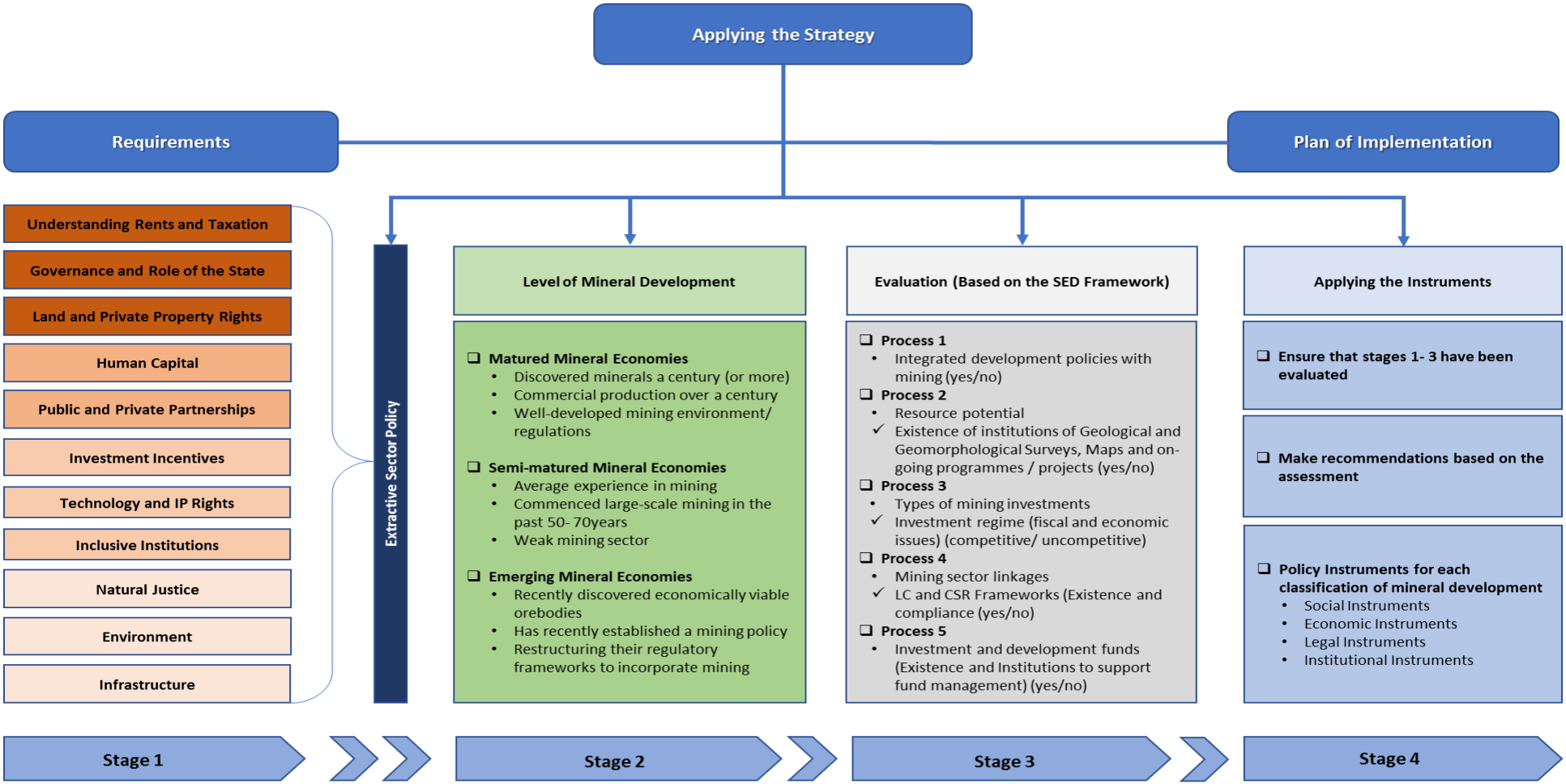


Figure 8.1: Process in Applying the Strategy

Source: Researcher's Conceptualisation (2017)

8.2 Classification of Gold Mining Countries in Africa

Before proceeding to the classification of countries, it is imperative for all eleven requirements (discussed in Chapter Seven) to be present in the mineral economy intending to implement IFRAD. The next step (which is the twelve requirement) is for countries to identify their maturity levels in mineral development. Extracting from the classification's table (see *Table 7.1* of Chapter Seven), the elements are teased and applied to *Table 8.1*. The four countries being considered have been discussed in the research methodology section of Chapter Four (refer to pages 72- 78) of this Thesis.

Table 8.1: Classification of Countries Based on Levels of Mineral Maturity

Characteristics	**Levels of Mineral Maturity***				
	Number of years in commercial gold mining	**Length of existence of mining frameworks**	**Integration of mining with local economy**	**Mining's impact on economic growth**	**Classification**
Indicators	*Year of first commercial production*	*Year of first legislated mineral law (post- republic state)*	*Economic multipliers- Gross Value Added (direct and indirect impacts) ‡*	*% of total mineral exports to merchandise exports*	
Countries					
Ghana	Official gold production records date from the 1400s until now	Mineral laws (1962; 1986; 2006)	2.80	11.13%	Matured mineral economy
DRC	Official mineral production records begun in late 1970s (under the Zaire)	Mineral law (2002)	-	67.80%**	Emerging mineral economy
Tanzania	Official gold production records date from the 1800s until date	Mineral laws (1979; 1998; 2010)	2.52	11.09%	Semi-matured mineral economy
South Africa	Official gold production records date from the	Mineral laws (1964; 1967; 1991; 2002)	2.20	17.3%	Matured mineral economy

Sources: Table 7.1; World Gold Council- WCG (2015); World Bank (2016), WDI Dataset

* For detailed definitions of the characteristics (see p.170) of Chapter Seven.

‡ The WGC (2015: p. 32- 33) refer to gross value added (GVA) as "the rise in demand and economic output created in other industries because of gold mining activities". The GVA values for the DRC was not calculated in the World Gold Council's assessment.

** The average for the DRC covers (1970- 1978) only.

From *Table 8.1*, the four gold producing countries- Ghana, DRC, Tanzania and South Africa are presented, with the last column depicting the classification based on the

level of mineral development and maturity. The rationale for classifying the countries (in *Table 8.1*) is explained below.

8.2.1 Matured Mineral Economies

The justification for classifying Ghana and South Africa as matured economies is premised on the long history of mining. Both countries started mining gold and diamonds quite early. Ghana from 1400s and South Africa from the discovery of gold in 1800s. These two countries have legislated mining laws within the last fifty to sixty years post-republic status. In terms of integration of mining with the local economy, a value-added multiplier analysis, which shows the direct and indirect impact of gold mining by the WGC (2015) indicated that both countries exceed the median of (2.52) with Ghana having obtained (2.80) and South Africa obtaining a value of (2.50) from a median of (2.10)[62] Such multipliers show the linkages of mining with the local economy. Also, the two countries have above median scores of 11.13% and 17.3% when the percentage of ores and metals to merchandise exports are averaged from 1970s to 2015. The SSA median is 3.67%. Countries above the median of 3.67% show a significant reliance on mineral exports for growth.

8.2.2 Semi-Matured Mineral Economies

Tanzania is classified as a semi-matured mining economy despite its long history of commercial gold production from 1800s. Post-independence 1961, Tanzania established its first mining legislation in 1979, followed by the 1998 Minerals Act and the current Mining Act of 2010. With the resurgence in mining after the 1990s and the two main global seniors' (Acacia, formerly African Barrick Gold and AngloGold

[62] The World Gold Council value added analysis conducted in 2015 was used to facilitate the classification. This was to show the integration of mining with other sectors of the economy. See definition for GVA in *Table 8.1.*

Ashanti) dominating the industry, commercial production buoyed after 1995 (Magai and Márquez-Velázquez, 2011). The average percentage of ores and metals to merchandise exports (from 1970 to 2015) remains at 11.09%, which is above the regional median of (3.67%) (World Bank, 2016). With the length of its mineral legislations under fifty years, Tanzania is classified as a semi-matured mineral economy.

8.2.3 Emerging Mineral Economies

On the four parameters, except the GVA, which could not be ascertained for the DRC, it has less than twenty years of mineral development and mineral sector governance, post the Congo civil war. Due to the two civil wars in 1996 and (1998- 2003), which led to the stagnation of the economy, many facets of the economy's infrastructure deteriorated. Because of the two civil wars, there have been many disruptions to nation building. Despite the significant impact of mineral rents to GDP growth, the economy is highly delinked from the minerals sector. As was noted earlier, 90% of all gold mining is at the artisanal level (ECA, 2016c). Thus, the DRC is classified as an emerging mineral economy.

This classification (which was devised in Chapter Seven) can serve to categorise and identify levels of mineral development in mineral economies in Africa, and to target specific instruments for sustainable economic development. The next sections present the method and evaluation of IFRAD in the four countries.

8.3 IFRAD's Assessment in the Selected Gold Mining Countries

The section recapitulates the method of analysis. Here, the four countries' mining sectors will be assessed using the SWOT tool to determine the gaps and bottlenecks. For IFRAD, the SED tool (in section 6.3 of Chapter Six) and its points of strategic

assessment is used to evaluate whether the enabling environment to transition IFRAD is in existence. If so at which points within the SED process are crucial for a mining country for IFRAD's implementation? *Table 8.2* extracts the key points from the SED tool in Chapter Six.

Table 8.2: SED Tool for the IFRAD Strategy's Implementation

Elements of the Strategy	Points of Strategic Assessment
Process 1: *Integrating mining with national development objectives*	What are the country's express development objectives as well as mining's (potential) objectives'? Have they been aligned and have mining been integrated into the national development and industrial policies and strategies of the country?
Process 2: *Understanding the resource potential of the country*	Is there a national inventory that maps the economic potential of the mineral resource? Have governments set targets on acquiring information on the demonstrated mineral resources that is within its' jurisdiction, and are there on-going projects (government-led, private exploration (joint venture-ship with governments) and or regional-based, aimed at building the geological information of mineral ore bodies in the country?
Process 3: *The type of mineral investments*	What types of mineral investments exist and is the investment regime competitive? How are current mining investment (development) agreements structured? What new (potential) and current risks have affected the regime and how has it affected mining investments?
Process 4: *Mining sector linkages (rent generation, capture and management)*	How competitive is the current regime with other mineral regimes in Africa? Have effective safeguards been established in the legislative framework to support mining sector agencies? In terms of building critical mining sector linkages, is the economy's local content and CSR policies well integrated with its fiscal policy? And have government been successful in managing various risks factors which influence mining investments?
Process 5: *Managing investment portfolios*	Considering the current level of development of the economy, are there established transparent institutional processes and mechanisms to set up a fund?

Source: Extracted from Chapter Six- *Table 6.2: A Tool for IFRAD's Assessment in Mineral Economies*

To streamline the discussions, the ensuing assessments are presented under the following themes: evaluation using the CIF to assess competitiveness; and the general assessment of the selected countries. The first part discusses *Process 3*, and the fiscal aspects in *Process 4* guided by the CIF; whereas, the second part, discusses in brief the general assessment of the five Processes within IFRAD. Due to the nature of the assessments for the four countries, only the results and main findings are presented in the Chapter.

8.4 Evaluation of the Competitiveness of the Selected Countries

As regulator, a government's fiscal regime and how competitive the regime requirements are, are essential to attract mining investments. The CIF, which was included in the SED tool is used to make comparison of the fiscal regime in the four countries. *Table 8.3* illustrates the data calculated for the CIF. The parameters in the CIF for the *ten* (10) highest global gold producers have been averaged (for 2016) and the global average (for 2010) are compared with the results of the selected case study countries.[63] Also, rating on the scores for economic system in the SDI is included in *Process (4a)* to highlight the current state of their economies.

Table 8.3: Results on the Parameters of the Competitive Investment Framework

Parameters SED Tool (Chapter Six)	Global Averages (2010 & 2016)		Gold Mining Countries			
	2010 CIF Average	2016 CIF Average for Gold Mining Economies*	Tanzania	Ghana	South Africa	DRC
Process 3: Mineral Investments						
Tax stability agreements	Yes	Yes	Yes	Yes	Yes	Yes
Tax treaties	Yes	Yes	Yes	Yes	Yes	Yes
Process 4: Mining Sector Linkages						
Process 4a: Economic Aspects						
Scores extracted from Economic System SDI in Chapter Four	-	-	Average	Poor	Average	Bad
Process 4b: Fiscal Aspects						
Corporate tax rate (national)	23%	22.05%	30%	35%	(0%- 32.5%) Acc. to a spec. formula for gold mining	30%
Branch office tax	25%	25.55%	25%- 30%	25%	28%	35%
Income tax credits for foreigners	Yes	Yes	Yes	Yes	Yes	No
Minimum corporate tax	1%	X	25%	x	X	x
Additional profits tax	3%	No	No	10%	No	No
Tax holidays (years)	Yes	Yes	Yes (and a lower royalty rate at the beginning of production)	Yes (during pre-production)	Yes/No	Yes

[63] The countries included- China, Russia, Australia, United States (Various States), Canada (Quebec, British Columbia and Ontario), Peru, South Africa, Mexico, Uzbekistan and Ghana.

Parameters SED Tool (Chapter Six)	Global Averages (2010 & 2016)		Gold Mining Countries			
	2010 CIF Average	2016 CIF Average for Gold Mining Economies*	Tanzania	Ghana	South Africa	DRC
Ring fencing	No	Yes	Yes	Yes	Yes	No
Forward carry of losses (years)	Yes	Yes (12.9 years)	Yes, indefinitely	Yes (5 years)	indefinitely after it has been assessed	Yes, indefinitely
Backward carry of losses	No	No	No	No	No	No
Depreciation (years)	SL	41.87% (LOM)/ Method SL	100% (LOM)	20% over the life of the mine	Up to 50% on mining assets (1- 25) over the life of the mine	100% (LOM)
Capital gains tax	24%	Yes (21.65%)	x	15%	22.4%	Treated as CIT
Tax on assets	Yes	Yes	Yes	Yes	No	Yes
Value added/sales tax	17%	Yes (11.44%)	0%	14% generally (Mining exempt)	14%	0%
Fuel tax	Yes	Yes	Yes/No	Yes/No	Yes/No	Yes
Repatriation/dividend/ withholding tax	3%	Yes (11.8%)	5%- 10%	8%- 10%	10%- 15% on dividends	10% on dividends
Import duties	0%	0%	0%	Exempt for mining plant & machinery (all others for mining attract 5%)	0%	Mining exempt
Export duties	0%	0%	Mining exempt	Mining exempt	Mining exempt	Mining exempt
Payroll tax	Yes	Yes	Yes	Yes	Yes	Yes (0%- 40%)
Land tax	Yes	Yes	Yes	Yes	Yes	Yes
Provincial (State) taxes	Yes	Yes	No	No	Yes	Yes
Municipal taxes	Yes	Yes	No	No	No	x
Royalty rate	X	4.39%	4%	5%	(0.5- 5%) for refined/ (0.5- 7%) for unrefined	2.50%
Transfer pricing rules	X	Yes	Yes	Yes	Yes	Yes
Process 4f: Risks						
Moody Rating (2016) (Financial, economic, country and political)	Not calculated	Not calculated	B1	B3	Baa2	B3

Multiple Sources: (Ernest and Young, 2015; Hudson and Oshokoya, 2011; Moody's Rating, 2017a, 2017b, 2015b, 2015a, 2015c; PwC, 2012); Mining Acts of DRC, Ghana, South Africa and Tanzania - (DRC, 2002a; GoG, 2006; Republic of South Africa, 2002; The United Republic of Tanzania, 2010)

*Annex 8.1 shows the data for the gold producing countries, which were aggregated for the global average in the CIF for 2016.

From *Table 8.3*, Tanzania, Ghana, South Africa and DRC's fiscal requirements have been highlighted. Some of the parameters in the table are discussed in light of the four countries' competitiveness to attract mining investments and whether the enabling environment is sound bearing in mind IFRAD's requirements. The goal is to determine whether the regime requirements are competitive compared to their global compatriots.

Corporate Income Tax (CIT) & Branch Tax

In terms of general mining taxes, the four countries CIT is higher than the global average for 2010 and the average for gold producers in 2016. The average 'branch tax rate' for the 2010 CIF was the same for the 2016 global average for gold producers, except for DRC and South Africa.

Royalty and Other Taxes

Royalty rates amongst the three countries (Ghana, Tanzania and South Africa) are close to the global 2016 CIF average. The DRC however, has a lower flat royalty rate of (2.5%) for gold compared with the other three countries. With regards to other forms of taxes in mining, it can be seen from *Table 8.3* that many gold producers rely on various tax instruments at the provincial and municipal levels; additionally, taxes for land, fuel and VAT on sales. Export and import duties are (0%) or in some cases 'mining' remains exempt, except in Ghana, where import duties is (0%) for only mining plant and machinery. Overall, the rates and duties for the selected countries are competitive with the 2016 global average for gold producers.

Investment Treaties and double tax treaties (DTTs)

Globally, most gold producers have stability agreements or clauses in existence to guard against frequent regime change. Regarding investment treaties/ agreements, all the four countries have signed investment agreements within Africa either (between individual countries or within the regional economic communities- RECs) or outside

the continent. Ghana, DRC and Tanzania have signed DTTs with South Africa due to the presence of South African gold mining companies and investors in other productive sectors of these regimes. South Africa has one of the highest number of investment treaties and DTTs signed within and outside of the continent (refer to ECA, 2016b: p. 51- 54, on the number of the investment agreements between countries for the four countries). Stable regimes usually have more signed treaties than non-stable regimes and can sometimes signal investor confidence in the regime.

Sovereign Risks

The level of sovereign risk may influence the rate of competitiveness and the credit worthiness of the State. Using Moody's sovereign risk rating for 2015- 2017 as a proxy (under *Process 4f*), the values are juxtaposed with the overall scores on the economic system (in Chapter Four) to show the relationship between risks and the state of the economy in *Figure 8.2*. The timeline (2015- 2017) is used because not all countries were rated, for instance, Tanzania was only included in Moody's rating system in 2017.

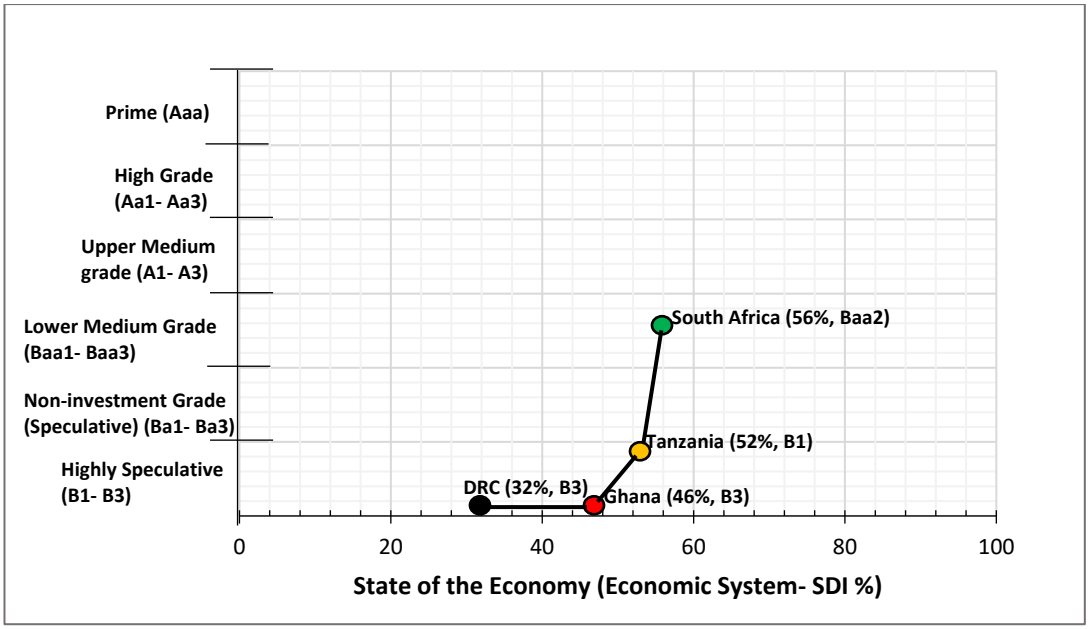


Figure 8.2: Sovereign Risk vs. State of the Economy

Sources: Chapter Four (see pages 98- 99); Moody's Rating (2017a, 2017b, 2015b, 2015a, 2015c)

From *Figure 8.2*, as sovereign risks increase (for e.g. from lower medium grade to highly speculative), investors are dis-incentivised from investing in the economy. Riskiness has an impact on investor perceptions and the state of the economy. The figure also shows that despite all four countries being competitive on the CIF, when using Moody's rating, (Tanzania, Ghana and the DRC) have stable but speculative credit rating. Usually in the rating, potential and current risks to the economy are factored in the calculation. Amongst the four countries, South Africa largely remains competitive with a slightly better score on the state of the economy than the three countries. From the discussions in the CIF, the four countries fiscal requirements remain competitive when benchmarked against global gold producers as well as the 2010 CIF average for mining countries (refer to *Table 8.3*). Although some of the countries, such as the DRC have lower fiscal requirements through lower royalty rates and tax breaks for miners; ultimately, it is how stable and clear a regime's entire mining requirements are (with little room for speculation), which will motivate miners to invest in an economy. The next section discusses the four countries' evaluation on IFRAD under matured, semi-matured and emerging mineral economies.

8.4.1 Assessment of Matured Mineral Economies

In evaluating Ghana's and South Africa's mineral and development frameworks, the assessment considered the state of their mineral economies vis-à-vis the IFRAD Strategy, i.e. where they are in the SED process, and whether they should implement the Strategy. The five Processes (1- 5) and the evaluation of the results for Ghana and South Africa are presented in *Table 8.4*. The findings from the CIF are also included in the table. The 'yes' and 'no' are a summary of the results and discussions of the SWOT and evaluation of the SED framework gleaned from Annexes 8.2 (a- b) and Annexes 8.3 (a- b) for Ghana and South Africa respectively.

Table 8.4: Evaluation of Processes (1- 5) for Ghana and South Africa

Processes (1 - 5) of IFRAD	Ghana	South Africa
Process One: Development Objective		
Integrated Development Plan with Mineral Development objective	Yes	Yes
Process Two: Resource Potential		
Knowledge of Mineral Reserves and Resources	Yes	Yes
Process Three: Mining Investments		
Type of Mining Investments	Competitive	Competitive
Process Four: Mining Sector Linkages		
4c. Institutional Framework		
Agencies (Support Mining Investments)	Yes	Yes
Agencies (Monitoring and Compliance)	Yes	Yes
Agencies Responsible for Managing Mineral Revenues	Yes	Yes
4d. Social		
Local Content	Yes	Yes
CSR Policy and guidelines	Yes	Yes
4e. Environment		
Environmental law and due diligence	Yes	Yes
Health and Safety	Yes	Yes
Process Five: Managing Investment Portfolios and Options		
(Wealth Funds) Investment	No	No
Direct Investments	Yes	Yes

Sources: Annexes 8.2 (a- b) and 8.3 (a- b)

Ghana's IFRAD Process

From the summary of the results in *Table 8.4*, Ghana has clearly defined policy goals for its mining sector and its medium to long term development plans/ frameworks have been integrated with its mining sector. Thus, based on the evaluation of the mining sector and the SWOT (in Annex 8.2a), there is opportunity to enhance the critical linkages needed in the sector. The economy can benefit from having in place an optimal mining investment Strategy that integrates some of the key processes within IFRAD. Because the economy is matured and have implemented many of the instruments under (*Processes 1- 3*), it can apply the Strategy from *Processes 4- 5*. The schematic in *Figure 8.3* is a map of how the Strategy should be applied to Ghana's unique context.

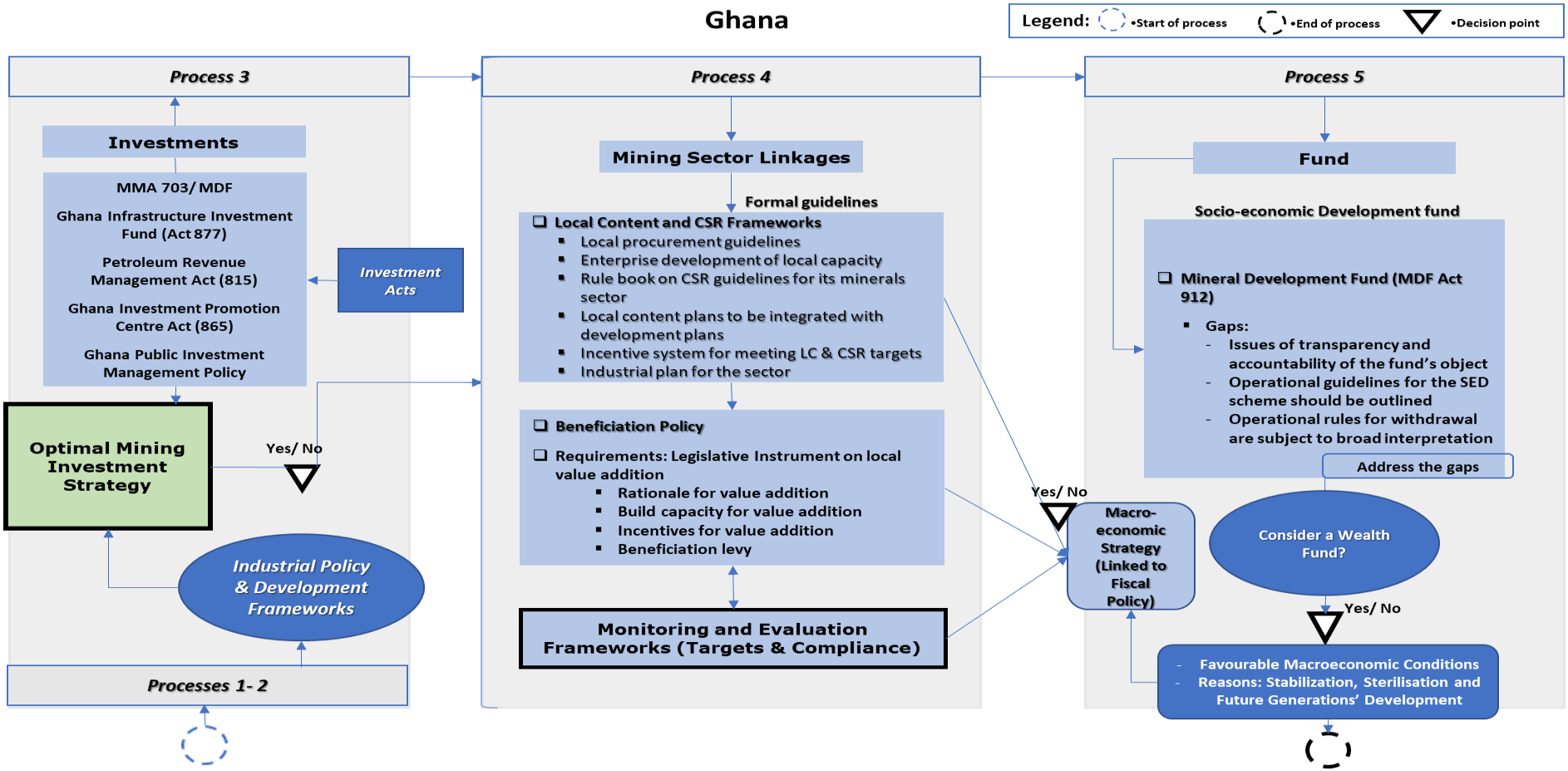


Figure 8.3: Schematic for Applying the Strategy in Ghana

Source: Researcher's Conceptualisation (2017)

Although its development frameworks are integrated with the mining sector, *Figure 8.3* suggests that starting from *Processes 1* and *2*, the country needs to re-calibrate its industrial policy with productive sectors of which mining plays a significant role. *Process 3* also shows the need to coordinate all the investment Acts: Ghana Infrastructure Development Fund Act 877, Petroleum Revenue Management Act 815, and the Ghana Investment Promotion Centre Act 865 with the Strategy. A decision point, is whether its government wants to maintain an investment Strategy that links the national level interventions in mining from pre-feasibility to sale of mineral resources. If 'yes', then at the stage of mining sector linkages, its CSR and LC policies would need further guidelines and target-setting to ensure that MNCs reach the targets set by the State. The three instruments- LC and CSR, beneficiation must be contoured on a M & E framework to ensure compliance. Under *Process 4*, the Minerals Commission can benefit from an overarching framework to synchronize the sector's regulations (2173- 2176; 2182) (see Government of Ghana- GoG, 2012a, 2012b, 2012c, 2012d, 2012e) with the macro-fiscal frameworks. In partnership with industry players, Ghana's Minerals Commission may have to:

- Set 'local' local content targets for gold operating MNCs;
- Elaborate through guidelines on CSR requirements for industry players;
- Set mandatory guidelines for annual reporting on industry performance on the targets in the LI (2174- 2177; 2182); and
- Decide on developing a L.I. for beneficiation of minerals.

If the recommendations are adopted, then the industrial plan and the second Ghana Industrial Policy (GIP) may have to broaden its mandate to incorporate expert skills required for mining value addition (refer to Annex 8.2b). Under *Process 5*, the government recently introduced the Mineral Development Fund (MDF) Act 912 to develop mining communities (GoG, 2016). The MDF Act 912 is ultimately *a game changer* since it establishes a fund for SED purposes from mineral royalties, which

accrue to government. Here, there can be room for consideration of a wealth fund (should the Board) and the mineral sector institutions deem it appropriate to provide future generations with a stake in Ghana's mineral resources. Thus, a decision point under *Process 5* is whether there should be considerations for a wealth fund. The institutional set-up and mining sector agencies are already in place to govern such a fund if the government decides.

South Africa's IFRAD Process

South Africa's economic development policies have been driven by its mining sector and with the MPRDA of 2002 and the BBBSEE mining charter spearheading the integration of the sector with its development objectives. Its current long-term growth strategy, the National Development Plan (NDP) is aligned to its mining development objectives. *Processes 1- 3* are well-coordinated (refer to Annex 8.3b for the interlinkages between the development frameworks and mining). Under *Process 4*, the clarity and extent of the MPRDA's environmental regulations, fiscal incentives, beneficiation and the powers of the Minister in terms of cancelling mining rights need further determination. Also, the third edition of the current mining charter has come under scrutiny due to a lack of consensus on some of the new requirements. Of this, suggestions have been made for clarity on the newly introduced interventions, and whether the process was transparent enough to include the concerns of all stakeholders by the Chamber of Mines and civil society (Baxter, 2016; Creamer, 2016; Matthew, 2017). Based on the evaluation of the five processes, it can be argued that from *(Processes 1- 5)*, the country finds itself at the tail end of *Processes 4* and *5*. This is because the institutional mechanisms exist as well as the coordination of its development and industrial policies. *Figure 8.4* showcases the schematic for South Africa. For *Process 5*, see *Figure 8.4*, there's a case to be made for wealth funds for sterilisation and stabilisation purposes, as well future generations' development.

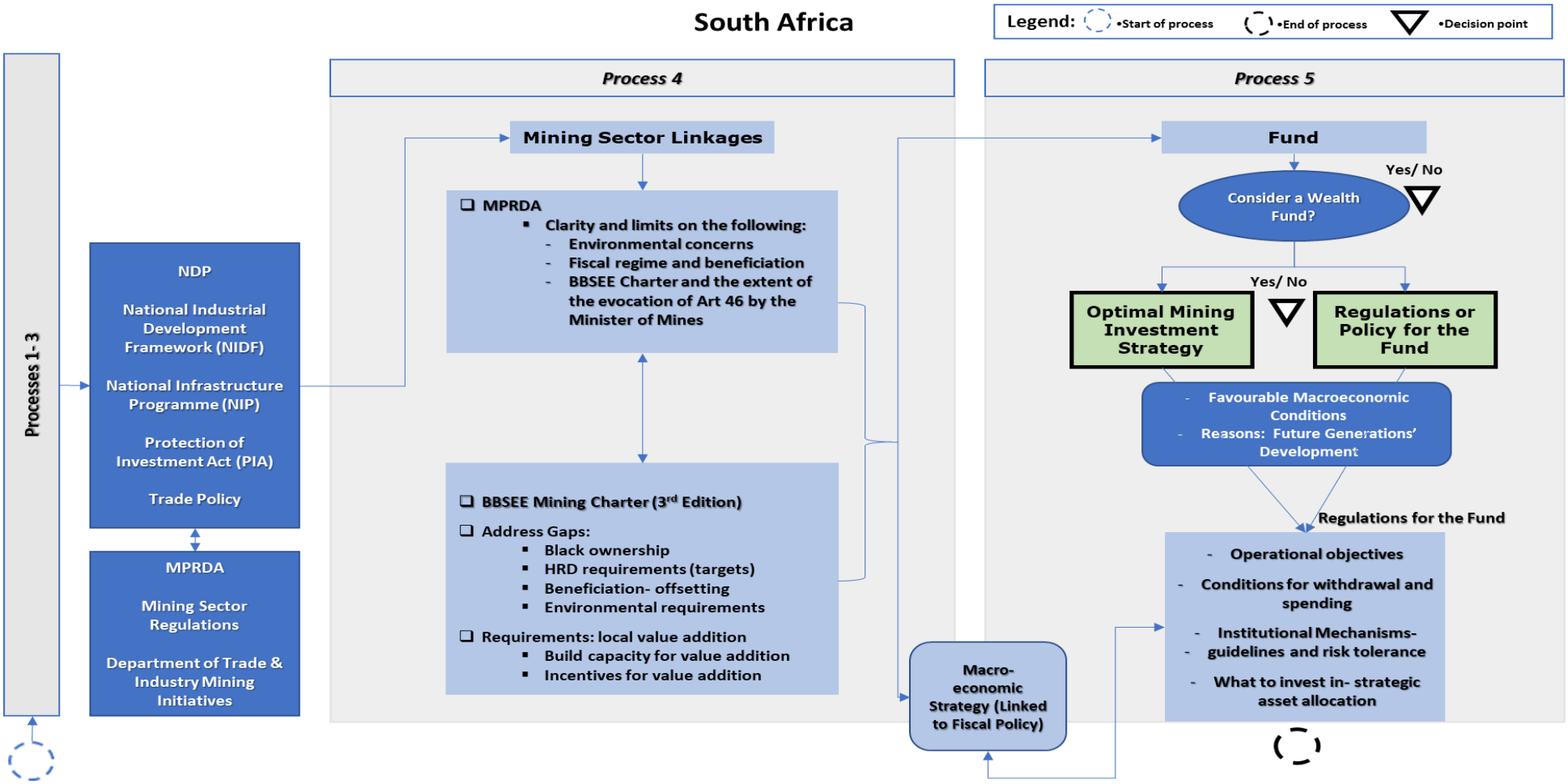


Figure 8.4: The Schematic in South Africa's Case

Source: Researcher's Conceptualisation (2017)

From *Figure 8.4*, a decision point here is whether South Africa should consider a fund and if 'yes', would the State further consider a policy (or regulation) to manage the fund? A commission of enquiry to study the benefits for the economy should be pursued extensively. The policy instruments needed in each of the processes for Ghana and South Africa are itemised and illustrated in Annexes 8.2c and 8.3c. Each process within the schematic must be in synch with the associated policy instruments. As noted in Chapter Seven, for instruments that have been defined in their national development objectives and have been operationalised in a country, only the most relevant instruments (that are yet to be maximised) per each process of IFRAD should be considered.

8.4.2 Assessment of Semi-Matured Mineral Economy

Tanzania has had multiple development frameworks (industrial, investment, trade and poverty reduction) aimed at achieving the Tanzania Development Vision (TDV) 2025. However, there have been challenges with the sequencing of development priorities and difficulties in mobilizing domestic financial resources, as the drawback to implementation of its development policies (The United Republic of Tanzania, 2011). *Table 8.5* summarises the results of the five processes for Tanzania. Annexes 8.4 (a-b) show the detailed analysis for Tanzania.

Table 8.5: Evaluation of Processes (1- 5) for Tanzania

Processes (1 - 5) of IFRAD	Tanzania
Process One: Development Objective	
Integrated Development Plan with Mineral Development objective	Yes
Process Two: Geological Potential	
Knowledge of Mineral Reserves and Resources	Yes/No
Process Three: Mining Investments	
Type of Mining Investments	Competitive
Process Four: Mining Sector Linkages	
4c. Institutional Framework	
Agencies (Support Mining Investments)	Yes

Agencies (Monitoring and Compliance)	Yes
Agencies Responsible for Managing Mineral Revenues	Yes
4d. Social	
Local Content	Yes/No
CSR Policy and guidelines	Yes/No
4e. Environment	
Environmental law and due diligence	Yes
Health and Safety	Yes
Process Five: Managing Investment Portfolios and Options	
(Wealth Funds) Investment	No
Direct Investments	Yes

Source: Annex 8.4 (a- b)

Tanzania's IFRAD Process

From the assessment of the frameworks, there is in existence an investment policy with considerations for the mining sector's development objectives recognised in its development vision. That said, the SWOT also revealed weaknesses and threats to its mining sector, which may be overcome by having an optimal investment Strategy that integrates mining legislation, industrial policies and the national development vision of the country (refer to Annex 8.4a). The review also showed that Tanzania is currently under *Processes 3- 4* stages of the IFRAD Strategy, and essential strategies to optimise the needed linkages between the mining investment environment, social and economic development are needed. The schematic in *Figure 8.5* shows a map for applying the Strategy in Tanzania. Starting from *Processes 1* and *2*, the State would have to re-calibrate development policies and vision with other frameworks such as the National Investment Promotion Policy of 1996 and its industrial policy. Under *Process 3*, there is need for clarity [in terms of the Natural Wealth and Resources (Permanent Sovereignty) and the Natural Wealth and Resources Contracts (Review and Re-negotiation of Unconscionable Terms)], since these instruments can reduce investor confidence in the country. Due to this, a decision point, is whether the government wants to maintain an investment Strategy (see *Figure 8.5*).

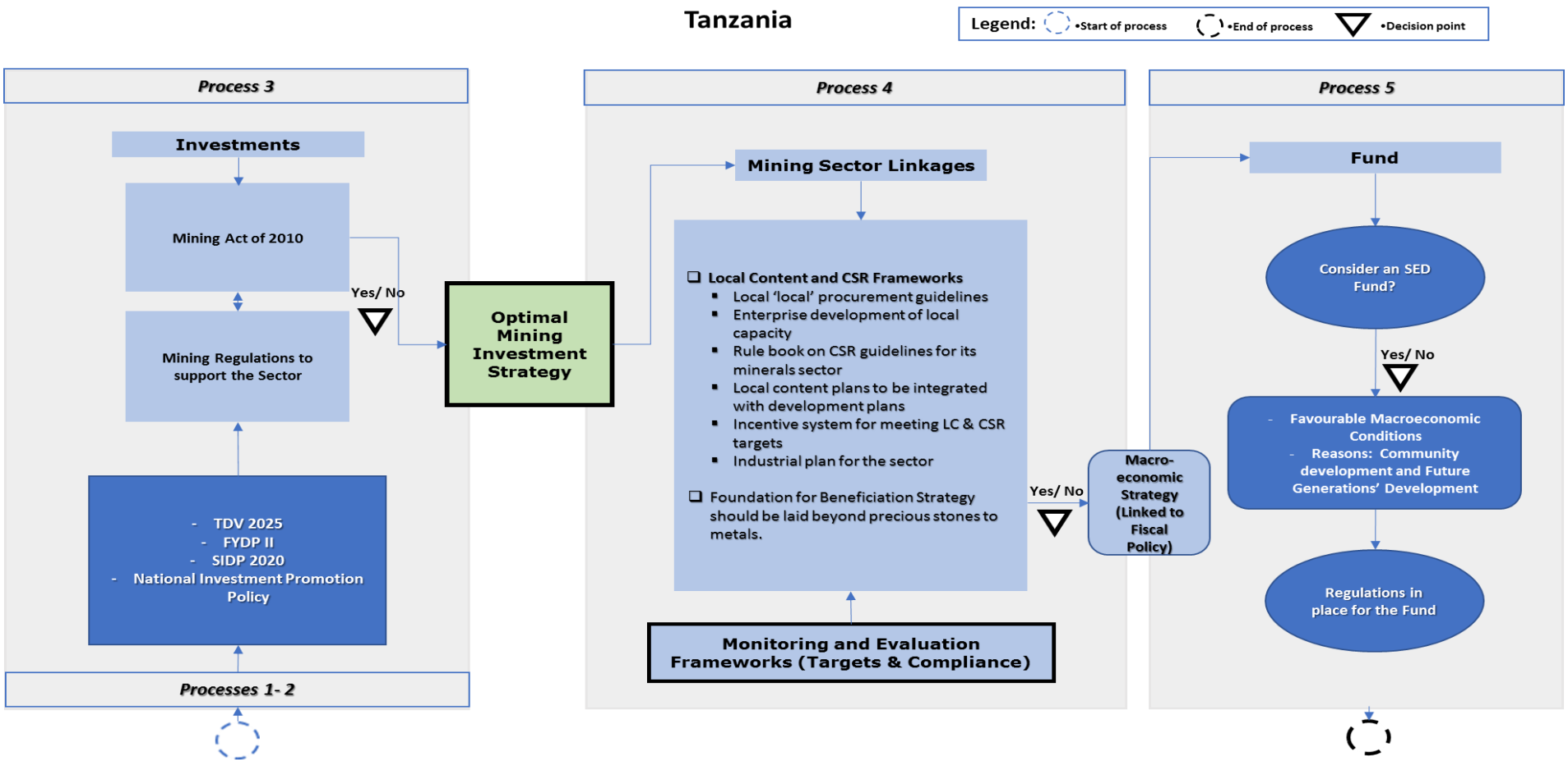


Figure 8.5: Schematic for Applying the Strategy in Tanzania

Source: Researcher's Conceptualisation (2017)

Under *Process 4*, there is need for holistic guidelines for LC and CSR, and the critical skills for its mining industry. Secondly, benchmarks and targets for the monitoring of the requirements in these guidelines are needed to ensure consensus in the varied approaches taken by MNCs when rolling out their CSR programmes (see Lange, 2016 for a discussion on local content in Tanzania). From *Figure 8.5*, if the government agrees to implement the IFRAD Strategy, then the next step under *Process 5*, is for the Ministry of Energy and Mines together with all stakeholders to agree on an SED fund from mining to support socio-economic development ends. Here, some of the conditions set in (Section 6.2.5 of Chapter Six) would have to apply. The policy instruments needed in each of the processes for the schematic for Tanzania are illustrated in Annex 8.4c.

8.4.3 Assessment of Emerging Mineral Economy

The DRC has achieved much and to revamp the sector, the evaluation revealed that it may have to commence from *Process 1* through to *Process 5*. *Table 8.6* summarises the results of the five processes for the DRC. Annexes 8.5 (a- c) show the detailed analysis for the DRC.

Table 8.6: Evaluation of Processes (1- 5) for DRC

Processes (1 - 5) of IFRAD	DRC
Process One: Development Objective	
Integrated Development Plan with Mineral Development objective	Yes/No
Process Two: Geological Potential	
Knowledge of Mineral Reserves and Resources	Yes/No
Process Three: Mining Investments	
Type of Mining Investments	Competitive
Process Four: Mining Sector Linkages	
4c. Institutional Framework	
Agencies (Support Mining Investments)	Yes
Agencies (Monitoring and Compliance)	Yes/No
Agencies Responsible for Managing Mineral Revenues	Yes
4d. Social	

Local Content	No
CSR Policy and guidelines	Yes/No
4e. Environment	
Environmental law and due diligence	Yes
Health and Safety	Yes
Process Five: Managing Investment Portfolios and Options	
(Wealth Funds) Investment	No
Direct Investments	Yes

Source: Annexes 8.5 (a- b)

DRC's IFRAD Process

From the summary of results, restructuring the sector with a clearly outlined extractive (mining) sector policy which defines principles for an effective mining cadastre system and creating the enabling environment for linkages are needed. Although, the SWOT pointed to strengths of its mining sector, amidst large infrastructure deficit, weak governance architecture and corruption; potentially, JICA, KRI International and Ernest and Young (2016) have noted the ability of the natural resource sector to transform the economy of the DRC (refer to Annex 8.5a). The schematic in *Figure 8.6* illustrates how the Strategy may be applied in the DRC. Annex 8.5b provides the analysis and interlinkages within the IFRAD processes. Starting from *Processes 1* and *2*, the country needs to re-calibrate its industrial policy with a new mining policy. As already indicated, an extractive (mining) sector policy is required, which draws on the interventions in the country's long and medium-term development visions, coupled with its industrial policy. A decision point, is whether the State wants to have an extractive sector policy. If yes, then under *Process 3*, all the investment policies and plans for industrial development would have to be anchored on the "optimal mining investment strategy". The country's Growth & Poverty Reduction Strategy Paper (GPRSP) 2 argued for a 'mining strategy' or policy to transform the sector. This can be the premise for such a Strategy in the DRC (see DRC-GPRSP 2, 2011, p. 67, paragraph 225 of its medium-term development framework).

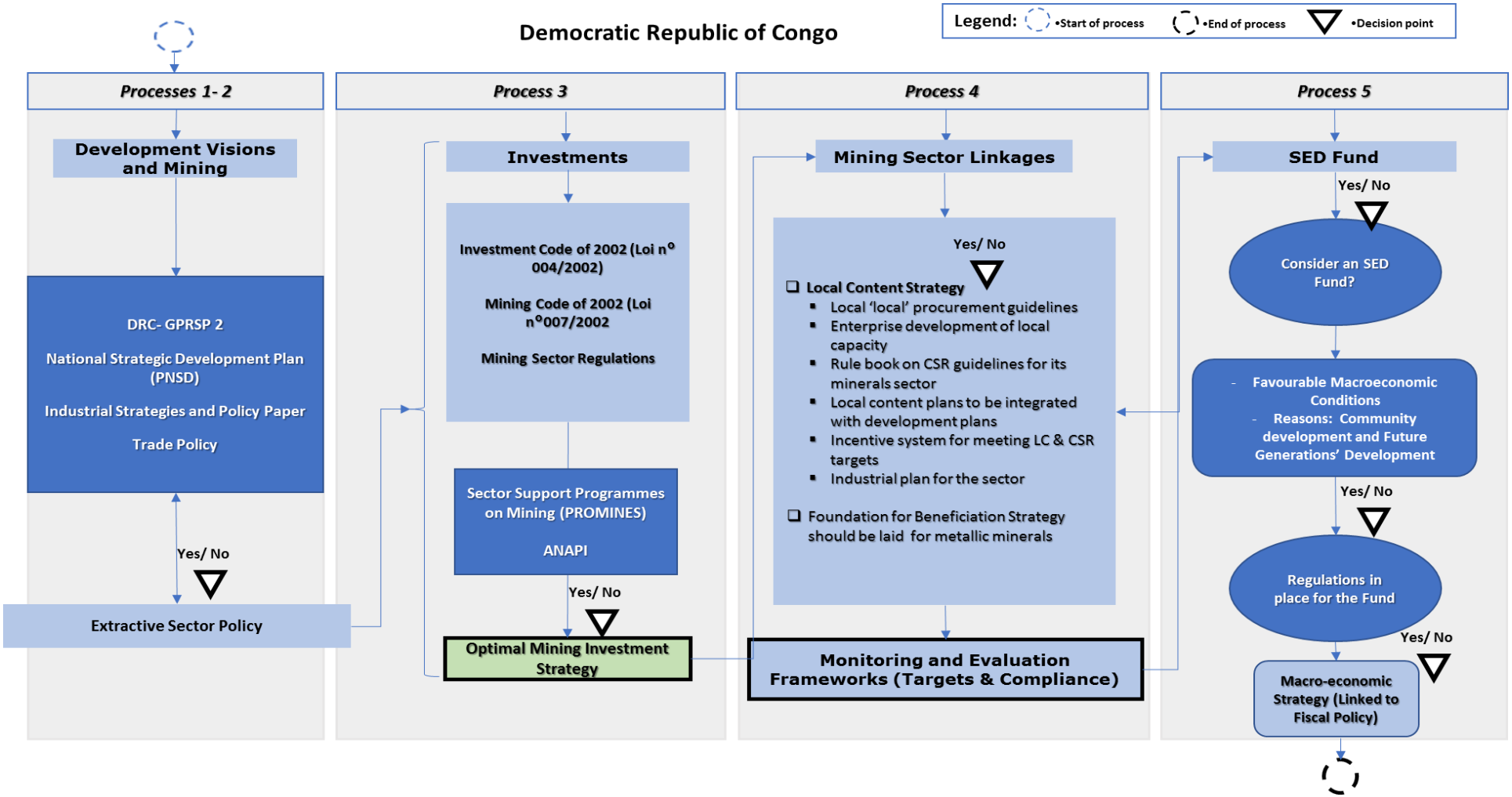


Figure 8.6: Schematic for Applying the Strategy in the DRC

Source: Researcher's Conceptualisation (2017)

From the schematic in *Figure 8.6*, if the government decides to have the Strategy, then under *Process 4*, there should be national level interventions, such as a LC strategy to build the critical mining sector linkages within the sector. The recent CSR guidelines developed by the Chamber of Mines-DRC need further determination and clarity hedged on the reasonable elements of the new mining code; as well as new principles developed for an extractive sector policy for the economy. This would enhance the delivery and compliance on targets set by the government. Here, mineral sector governance institutions must be capacitated to monitor compliance of the industry requirements. *Process 5* suggests an SED fund mechanism for community development. Here, there are two decision points, whether to have the fund and establish operational guidelines, and whether to link the Fund's set-up with macro-fiscal frameworks? With regards to *Process 5*, many countries set quotas and levies, but to incentivise miners, the performance on LC and the SED fund requirements can be linked to the fiscal regime to encourage compliance. In summary, reforms in the mining sector are critical now that the country is re-setting its development agenda post-GPRSP 2 and within the frame of the new mining code. It is thus imperative to develop the economy and reduce the infrastructure bottlenecks with a Strategy such as the IFRAD. To operationalise the objectives and recommendations, the policy instruments needed to transition the Strategy for the DRC is presented in Annex 8.5c.

8.5 Lessons: Re-calibrating Mining Frameworks and Development Visions

The above evaluation provided pathways to implementing IFRAD, while suggesting recommendations for operationalising the policy instruments in Annexes 8.2c, 8.3c, 8.4c and 8.5c for the different levels of mineral economies in Africa. *Table 8.7* summarises the final recommendations for the countries and which of the *Processes* would have to be considered in each phase of the Strategy.

Table 8.7: Implementation of the IFRAD Strategy in the Four Countries

Mineral Classification	Countries	Should countries Implement the Strategy?	From which stages in the 5-processes should they commence
Matured mineral economies	Ghana	Yes	Process 4 - Process 5
	South Africa	Maybe	Process 5
Semi-matured mineral economies	Tanzania	Yes	Process 3 - Process 5
Emerging mineral economies	DRC	Yes	Process 1 - Process 5

Source: Sections 8.4.1- 8.4.3

From the summary in *Table 8.7,* some countries (such as South Africa) have the requisite mineral sector governance instruments; hence, it requires government enquiry and interventions into new forms of revenue sustainability such as wealth funds. Ghana as a matured mineral economy should implement the IFRAD Strategy but framed within its industrial policy, while ensuring that *Processes 4 and 5* instruments are implemented. In Ghana, the industrial policy and plan may have to be re-calibrated and re-aligned with its mining policy.

In the DRC's case, it is suggested that a gap assessment of each of the Processes be conducted, while devising an extractive sector policy to transition the instruments in IFRAD. For the DRC, it further requires re-defining principles for the SED of its mining sector and the overall development of the country. For Tanzania's case, the IFRAD Strategy may also be needed under *Processes 4* and *5*, but this requires an alignment (between mining policies and the development vision 2025). Thus, in three out of the four countries, policy coherence and coordination are needed to ensure that processes, resources and programme and budget elements are unified in a manner that it reduces redundancy and duplicity of roles and functions (see Peters, 1998).

Overall, the evaluation of the IFRAD Strategy based on the tool points to the need to re-align mining frameworks with the development imperative of a country. Here, the

requirements (discussed in Chapter Seven) although not exhaustive are critical for realising the IFRAD Strategy in each country. National development frameworks such as development visions, industrial policies, and trade and investment promotion policies must be unified. Considering these observations, two interventions are discussed in light of *Table 8.7* for transitioning IFRAD at the national and regional levels.

8.5.1 National Level: Policy Coordination and Institutional Mechanisms

Inferably, in translating IFRAD, there is need to identify the horizontal and vertical elements of coordination in policy, and to build the coherency of a country's development frameworks towards a common goal. Additionally, in building policy coherence, the OECD's policy coherence approach can be used to recalibrate mining policy frameworks with development frameworks (OECD, 2012; 2008). The approach consists of three building blocks (exemplified in *Figure 8.7*) for mineral economies.

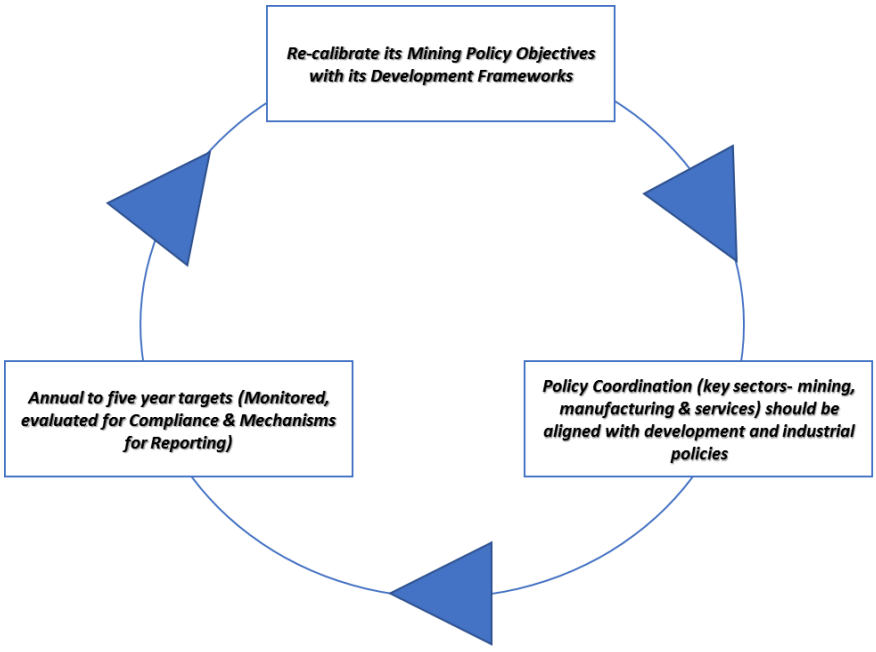


Figure 8.7: Policy Coherence of Development and Mining Frameworks
Source: Adapted from OECD (2008), Synthesis Report on Policy Coherence

From *Figure 8.7*, countries may have to firstly re-calibrate mining policies with development and industrial policies if mining is strategically a dominant sector. The second process is ensuring that all key sectors are aligned and coordinated with industrial policies; and the third is setting targets for monitoring and compliance. The point for coherency is to avoid policy and programme duplications within different sectors, and identify gaps, which may lead to increased costs and reduced efficiency in policy implementation.

For mining countries and in relation to the implementation of the IFRAD Strategy, the framework in *Figure 8.7* is intended as a guide for building coherency and coordination of its mining investment regime with development frameworks. When used strategically through a multi-stakeholder consensus, this can assist in gathering knowledge of current gaps, where inter-sectoral coordination is needed, and the kinds of institutional mechanisms required for policy convergence of a country's development goals and visions.

8.5.2 Regional Level: Framework for Investment Integration in Africa

Aside from the policy coordination needed at the national level, at the regional level, for Strategies such as IFRAD, there should be in existence harmonised regional mining investment frameworks that provide regional leverage for Africa's development. At the sub-regional level, there are several investment and trade frameworks by the Southern African Development Community (SADC) and between the COMESA, the East African Community and the SADC. The SADC currently has stipulations concerning investment agreement and arbitration, and financial regulations.

Regionally, there is the Continental Free Trade Area (CFTA), which sets the rules of engagement for trade and investments amongst the AU member States. As a new

framework passed under the Agenda 2063 for Africa, it is in draft stages and may be finalised by the end of 2018. Also under the Agenda 2063, the overarching investment code "the Pan African Investment Code" (PAIC) is a *game changer* for investment treaties since it sets out rules for IIA negotiations, while imbibing some of the SD principles set by the UNCTAD for investment negotiations (refer to AUC, 2016).

The PAIC was drafted in 2015 to balance investment protection and promotion by incorporating green investments. Since it covers all types of investments, there is the potential to build on the PAIC and to define frameworks to cover specific productive sectors, such as mining. Article 23 of the draft PAIC contends that "investors shall not exploit or use local natural resources to the detriment of the rights and interests of the host State" (AUC, 2016). This means that it affirms the UN fundamental principles of PSONR and could hence be used as an avenue to define a regional mining investment framework for mineral economies. Such a code can guide the fashioning of MDAs in Africa and how mining investment policies and strategies are structured. Ultimately, it can provide the impetus for regional mining investment framework which feeds into national level investment frameworks for RRA countries.

8.6 Conclusion

The Chapter set out to assess and evaluate how mineral economies are poised to implement the IFRAD Strategy. In three (Ghana, DRC and Tanzania) out of the four countries, it was suggested that gold mining economies consider firstly recalibrating their development and industrial development frameworks with the mining sector, followed by the implementation of the Strategy at the different stages of the IFRAD's *five Processes*. A schematic for applying the Strategy was devised for the four countries. In South Africa, the assessment in Chapter Eight resulted in

recommendations of the State to decide on whether to implement the Strategy, or to devise a regulation to guide the operations of a wealth fund.

It was further shown that policy coherence and coordination at the national level are needed for the re-calibration of development visions with productive sectors, such as mining in the case of the DRC and Tanzania. Overall, it was also suggested that a regional investment framework premised on the *'Pan-African Investment Code'* is warranted to guide the harmonisation of mining investment policies and strategies. To enhance synergies at the regional level, the AMV which was discussed (under *Process 1* in Chapter Six) must work in concert with the PAIC. As part of operationalizing the AMV through the country mining visions, there should be draft proposals and an eventual regional framework hemmed on the PAIC for mining investments to facilitate harmonisation. Such regional elements are crucial to building the competitive regional value chains for value addition in mineral economies in Africa.

Chapter 9

Conclusions and Recommendations

9.1 Introduction

This Chapter provides a summary of the Thesis; makes general recommendations in light of the findings; discusses areas for further research; and gives a view on the way forward for SED and the future of mining investments in Africa. The synthesis of the Chapters which guided the write-up is illustrated in *Figure 9.1*. This is based on a six-point pathway for devising growth Strategies.

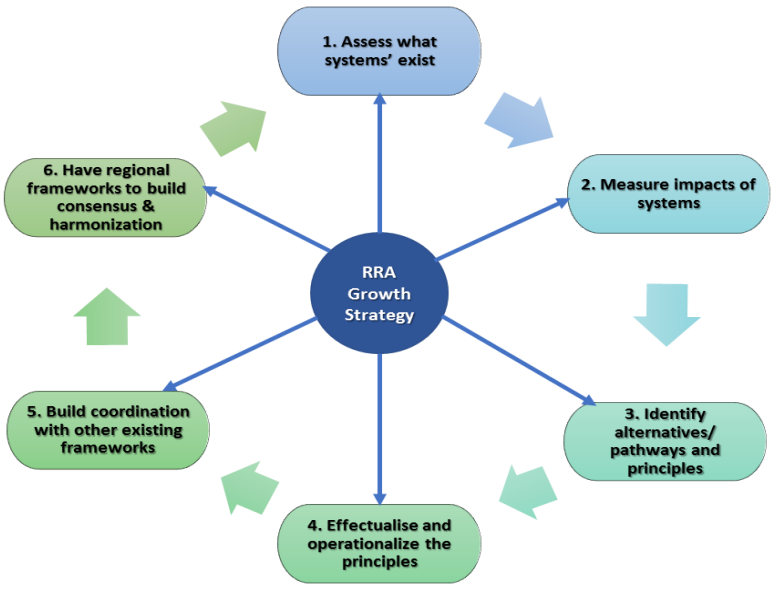


Figure 9.1: A Pathway to Devising Growth Strategies for Development

Source: Researcher's Conceptualisation (2017)

From Chapter One, the Thesis' assertions of the inefficiencies of the market system to yield high growth and development led to renewed efforts and actions toward SD as a way to cure the ills of the market system. As a result, under (points 1- 2, see *Figure*

9.1), 'economic systems and SD' were assessed, with SD's impact being measured in Africa's context. This was achieved from Chapters One to Four.

New pathways through optimal mining and SED were discussed as imperative for the growth of mineral economies due to the challenges of operationalising the ideal view of SD. Chapter Five proposed the bridge between SD and optimal mining as SED and the next step was to discuss principles in the pursuance of SED in RRA countries. From the discussions, SED consisted of a two-step process of national and extractive sector policies contoured on a third process of understanding the issues within the international investment regime (see *Figure 9.2*, which is an extract of the spiral process of SED from Chapter Five).

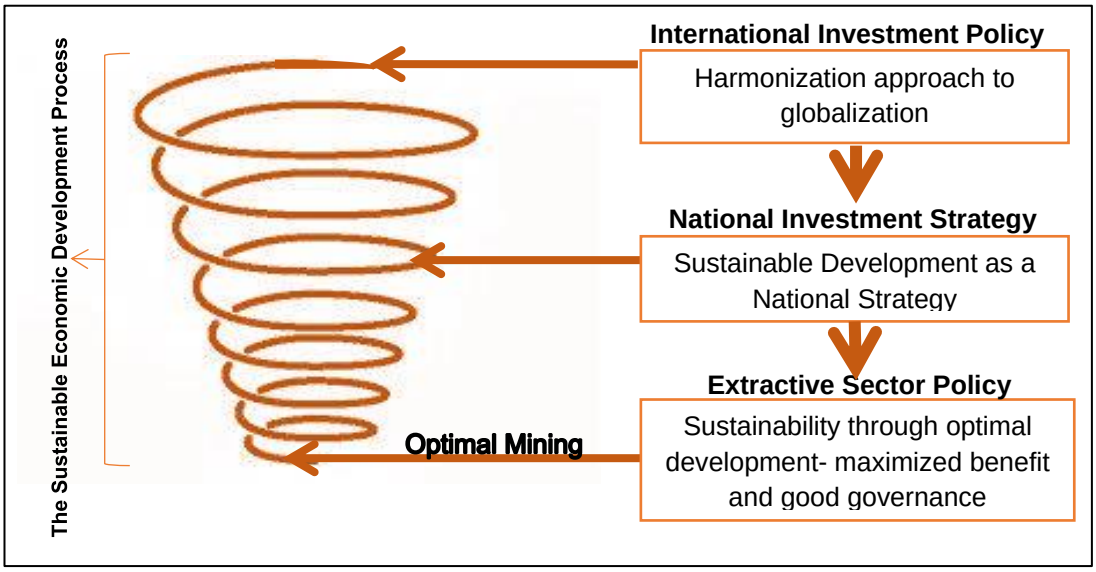


Figure 9.2: The Spiral Process of Sustainable Economic Development
Source: *Figure 5.7*: Chapter Five

The discussions in Chapter Five addressed points 3- 4 of operationalising alternate pathways to development. To operationalise SED under (point 4), an optimal mining investment Strategy for the SED of mineral economies was devised at the national level for mineral economies in Chapter Six. In terms of applying the IFRAD Strategy, the four gold mining countries- Ghana, DRC, Tanzania and South Africa, which were

measured with the SD indicators (in Chapter Four), were further evaluated with the IFRAD tool for implementation.

Finally, a recalibration of development visions and mining frameworks through national policy coordination mechanisms and the promotion of a continent-wide investment framework for regional harmonisation of mining investments amongst mineral economies were recommended. This was to ensure that countries abandon a *'race to the bottom'* mentality and aim at a stable mining investment regime where benefits and costs are equally shared between the investor and governments, and within the frame of optimal mining principles for Africa. This final assessment from Chapters Seven to Eight addressed points 5- 6 of the pathway.

9.2 Summary of Findings from Chapters One to Eight

The objective of each Chapter and the findings are summarised in this section.

9.2.1 Chapter One

The Chapter provided the background, rationale and justification for the research. It assessed some of the issues of SD in mineral economies and the shortcomings of economic theories to address the overall problem of inadequate growth and development in Africa. The research's focus on SD is borne from the fact that the concept as a discourse has become the yardstick to assess all forms of development at the project, national and global levels. Hence, the main objective of the research was *to interrogate the concept of SD and its applications within Africa's mining industry and economies*, with the aim to develop an effective 'Strategy' context-specific to Africa's mining needs. The Chapter finally concluded with the realisation that SD as a discourse would have to be refined to the needs of countries in Africa that are dependent on mineral resources from the perspective of optimal mining. Additionally, in view of the

limitations of market system, an assessment of economic systems was suggested to identify core principles and elements that are essential in the development of a 'Strategy' for the growth and development of RRA economies.

9.2.2 Chapter Two

Chapter Two's goal was to assess the three main economic systems- [traditional, command-socialist and the market], and the hybrid economic systems. Because the market and socialist forms of economic systems are the most applied, the two were reviewed extensively using Grossman's (1974) *ten* performance criteria of a 'good' economic system. From Chapter Two's discussions, it was proven that the market system was a better alternative although the hybrid combinations also presented a potent system for some economies, such as China and Norway. The conclusions of the Chapter further reiterated the merits of neo-liberalism together with the challenges of the economic -environmental nexus. This set the scene for the central chapters of the Thesis on SD and optimal mining.

9.2.3 Chapter Three

To situate the discourse of SD and mining, Chapter Three discussed the evolution of SD and the impact of the SD Goals on mining. It delved deeper into what SD means generally and mining's implementation of the concept at the industry and national levels. Have approaches to streamline SD been effortless for African mining countries, to what extent SD principles been imbibed in policy implementation, and what has been the outcomes? Consequently, the Chapter posited that the 'mining and sustainability' debate stem from five key issues: the challenge of definitions, the scarcity of ore bodies; the negative externalities from mining, the eroding of profits due to multiple stakeholders; and how to equitably share and use the benefits from mining. The final

discussions and conclusions based on the themes pointed to the need to develop a common interest definition for mining and to not waste mineral resources in the fulfilment of development obligations by mining countries. As a specific objective of the Thesis, it was important to emphasise calls for better indicators for measuring SD in the African context due to a lack of similar SD and mining frameworks at the national and local levels in mining.

9.2.4 Chapter Four

The Chapter's objectives were three-fold: to devise mining relevant indicators to measure SD; apply the SD indicators to a specific mineral sector (i.e. gold mining); and to assess whether the balanced components view of SD is appropriate for mining countries. The Chapter also provided the research methodology (in terms of the selection of the countries for the assessment and the sustainability indicators framework). From the discussions, the gold mining countries selected for the assessment were Ghana, the DRC, Tanzania and South Africa. Also, specific limitations to using aggregation (simple arithmetic mean formula) for the indicators and the criteria for selecting the gold mining countries were deliberated.

The findings showed some progress towards SD ends in some countries (refer to *Table 4.18* in Chapter Four). This is despite the difficulty in attaining the optimal balance between the three elements in the four countries. As was noted under the social system, South Africa's 'good' rating can be attributed to the robust monitoring and compliance of the BBBSEE requirements in its mining charter.[64] Undoubtedly, maintaining the balance between the three systems has been difficult in all the four countries, together with the balancing of natural wealth in between future and current generations. Finally,

[64] Although, this was the case in the South African context, it has been noted that the current rendition of the mining Charter has been subject to many contestations and is currently under review by the DMR.

the Chapter contended for considering innovative ways for optimal development of mining vis-à-vis SD considerations within Africa's unique context.

9.2.5 Chapter Five

The Chapter re-conceptualised what SD should mean for mining countries. There are trade-offs within the SD systems in mining; thus, the research opined that the triple bottom line view of sustainability may not necessarily transform mineral economies in achieving SD ends. For mineral economies, the concept of optimal mining/optimal mineral development was introduced as being interlinked with SD depending on the perspective one comes from. From the economic perspective of sustainability, optimal mineral development is the application of optimal extraction techniques, processes, and the optimal (economic) use of goods and services generated from mineral resources (see Cawood 2009; 2011). It was suggested that 'optimal' mining should be considered along the mining value chain, with strategies for maximally sharing mineral rents between the State, communities and mining companies. The uniqueness of the mining industry led to the conclusions that in rolling out SD principles in RRA countries, it must be premised on optimal strategies that use fiscal instruments (at the national level) to obtain a fairer bargain for rent and in rent management.

9.2.6 Chapter Six

To fulfil the recommendations of Chapter Five and a specific objective of the Thesis, the Chapter developed an '*optimal'* Mining Investment Strategy for mineral economies termed IFRAD. As was intimated in the Chapter, *elements* that are essential for investment policies for optimal mineral development were discussed. Based on the critical points and discussions, the IFRAD Strategy was devised around five processes with key strategic points of assessment (see 6.2 of Chapter Six). The processes in the

Strategy were then converted into an ‘optimal’ investment SED tool to assist countries in measuring the competitiveness of their investment environment. This was to also serve as a guide in implementing IFRAD. As a caveat, it was alluded that investment strategies in mineral economies should be driven by the mining sector and integrated with industrial policy (or a national diversification Strategy). This must aim to catalyse mining’s linkages with other sectors of the economy. For the IFRAD Strategy, it was iterated that due to the unique challenges and context of each developing country as well as level of mineral development, the approach to having a mineral investment Strategy must be context-specific to each country.

9.2.7 Chapter Seven

The Chapter presented the second part of the Strategy. It considered the requirements, policy objective and instruments for each process elements within IFRAD. Twelve essential requirements for the IFRAD Strategy were identified from global and regional frameworks of relevance to Africa’s mineral regimes. The second part of the Chapter considered a step-wise approach to the Strategy’s implementation. It was suggested that firstly, countries should develop a dynamic extractive sector policy, which capitalises on certain elements and instruments such as local content and CSR for socio-economic development. Secondly, before itemising the instruments, policy objectives, which encapsulate the nature of SED in mining, were highlighted, together with a classification scheme to help countries identify their level of mineral development. Three classifications: emerging, semi-matured and matured mineral economies were defined with specific instruments that must be present for an optimal mix when pursuing the IFRAD Strategy in mineral economies.

9.2.8 Chapter Eight

The penultimate Chapter discussed specific recommendations based on the evaluation of the four countries (Ghana, DRC, Tanzania and South Africa) using the tool for IFRAD. SWOT analyses of the four countries' mining sectors were conducted to identify gaps and opportunities for boosting mineral development. For each of these countries, different recommendations in light of where they stood regarding the *five* Processes were suggested. For matured mineral economies like Ghana and South Africa, *Processes 1- 3* are well anchored. For Ghana, the mining sector linkages needed to be contoured on the country's industrial policy as well as the objectives of its mining laws and policies. For South Africa, it was intimated that its sector linkages needed to be reinforced with forward looking policies that address historical legacies and the current state of the industry.[65]

In emerging mineral economies like the DRC, the evaluation suggested a reassessment of the entire mining framework and the crafting of an extractive sector policy to serve as a vehicle for the transformation of the mining investment environment. In Tanzania's case, as a semi-matured mining economy, lessons for securing investments and laying the foundation for linkages through a local content and CSR policies were recommended for the SED of the economy. A scheme, which maps out the steps and the requisite policy instruments essential for the Processes in all four countries were devised. The Chapter concluded with the need for policy coordination in mineral economies and a regional mechanism for consolidating and harmonizing investment policies in Africa.

[65] Beyond that, it was recommended that South Africa could do without the Strategy but may still need to decide on regulations (or an investment policy) for a wealth fund if the macro-economic conditions so allow. Ultimately, through empirical studies, the rationale for wealth fund can be justified for the country.

9.3 General Recommendations for the Thesis

This section discusses general recommendations in light of the main objectives of the research. It goes beyond the specific recommendations in Chapter Eight to discuss regional and national recommendations for achieving sustainable economic development *vis-à-vis* Africa's unique development context. Seven general recommendations are discussed for the SED of RRA economies. These are as follows:

9.3.1 Novel Approaches to the Market System for Africa's Development

The discussions in 'Chapter One' alluded to the shortcomings of economic theories and why despite economic rents from mineral resources, rapid growth has been elusive in resource-rich countries in Africa. That said, the system has proven the most resilient since there has not been better alternatives or approaches to sustained growth to date.

The shift from the socialist incentive (from the 1960s) to the market system (post-1980s) was because of the failings of a controlled state system, which crippled many countries in Eastern Europe and some parts of Africa in the past. This shift, although debatable led to a rise in GDP per capita (with about 7% average growth rate in the last decade for some countries) after the implementation of the SAPs.[66] Generally, the harsh impacts of the SAPs led to the shift to pro-poor policies and the fight for accelerated development and growth in mineral economies from the early 2000s. As such many medium-term development frameworks were fashioned along poverty reduction, accelerated growth and private sector development.

As a recommendation, the sketch of some of the market's, socialist's and hybrid's best features (outlined in Section 2.5.1) would be essential for the growth of frontier-

[66] This was also discussed in Chapters One and Two.

emerging and semi-matured mineral economies. Also, it would be imperative for more comparative analysis to be conducted with practical recommendations on alternative paths to improving the system based on African case studies. A similar framework (in section 9.1) can be followed to analyse novel approaches to the market system in steering the growth of economies in Africa.

9.3.2 Applying Optimal Mining Principles for Africa

A major assertion of the Thesis was the challenge of developing mineral economies to transition to the ideal view of SD. This was in terms of the balancing act within the SD systems. Furthermore, the assessment in Chapter Four pointed to deficits in realising economic sustainability with justification for pursuing SED as the bridge between optimal mining and SD. However, industry models for sustainability remain hijacked by the balancing components of the three systems. So long as this remains, there will be frictions between the systems of SD and the business case for profitability. Optimal mining principles remain relevant in achieving sustainability at the micro-economic and macroeconomic levels. Thus, as a second recommendation, the Thesis suggests that mining countries institute national level interventions premised on optimal mining principles to steer the industry. Chapter Five expanded on optimal mining principles; here, the safeguards can be teased from these to ensure that the goal of SED is achieved in mineral economies.

9.3.3 Sustainable Economic Development as a Goal for Mineral Economies

One of the ways to realising the SED of mineral economies is through an Optimal Mining Investment Strategy, which draws on other SED components for mineral development. The assessments of the four countries revealed some gaps in terms of SED frameworks and how countries have not optimised some of the critical components

such as LC and CSR instruments. Based on these observations, it is being recommended that mineral economies develop proper guidelines and strategies for local content and CSR to build the synergies needed within the sector with other productive sectors of the economy. In order for this to happen, a corollary recommendation is for countries to conduct a needs assessment of their mining frameworks together with their development/ industrial policies and legislate LC/ CSR instruments and guidelines. Here, there is need for clear guidelines, targets and M & E frameworks to guarantee effective implementation of SED strategies in their mining sectors. South Africa's previous BBBSEE Mining Charter can serve as a model guideline to be tweaked to the unique context of mining countries in Africa.

9.3.4 Linking Sustainable Economic Development Instruments

Based on the discussions in Chapter Eight, a fourth recommendation is for LC Strategies, particularly beneficiation to be linked to a country's fiscal regime. Here, an Optimal Investment Strategy can steer how a country's royalty framework is structured and the link between incentives for beneficiation and compliance. An example is the South African context, where the new royalty regime makes a case for beneficiation through the application of the following:

- for refined mineral resources (0.5% - 5%); and
- for unrefined mineral resources (0.5% to a maximum of 7%) (refer to the Mineral and Petroleum Resources Royalty Act, 2008).

This is based on gross sales and profitability (EBIT) of the mine in question. Although, not currently applied across all major commodities, its application to the gold sector can be learned and perfected for other economies aiming to pursue domestic beneficiation within local economies. While not discussed extensively in Chapter Six, the South Africa example elucidated above, show how to link fiscal frameworks with a beneficiation strategy (or in this case an SED strategy) for development. Even beyond

beneficiation, non-compliance of LC instruments, which are usually in the form of levies and penalties can be subsumed into a country's mining fiscal regime to create an incentive mechanism for local content.

9.3.5 Taking Stock of Mining's Impact

A fifth recommendation is to use the SD indicators devised at the national level (in Chapter Four) as a platform to monitor the impact of mining's sustainability in RRA countries. The SDGs have replaced the MDGs as the new goal post for development until 2030; for many mineral economies, indicators specific to the unique context of developing mineral economies for monitoring have yet to be devised. Because of the challenge of realising the ideal SD view, it is being suggested that regional institutions such as the African Union, the African Minerals Development Centre and the African Natural Resource Center of the AfDB use these indicators as the basis for cataloguing and collecting data on mineral economies and measuring the impact of mining. This is purely for data and measurement purposes since for mineral economies, SED is posited as an opportunity for transformation. Here, better and measurable indicators need to be devised for mineral economies; the selected indicators in Chapter Four can be the foundation for further assessments.

9.3.6 Policy Coordination for Development in Mineral Economies

The discussions in Chapter Eight alluded to the need for policy coordination of mining frameworks, particularly for the Strategy to be realised in the four countries. This means that in translating the Strategy, there is need to identify the horizontal and vertical elements of coordination in policy and build the coherency of the frameworks towards a common goal. Chapter Seven (under inclusive institutions) highlighted the critical actors and institutions needed to enhance the IFRAD Strategy; thus, the framework

adopted from the OECD (2012, 2008) may need consideration when re-calibrating and aligning a country's mining objectives with development. Per the observations in Chapter Eight, the point for coherency is to avoid policy and programme duplications and gaps amongst different sectors, which may lead to increased costs and reduced efficiency in policy-making. Through such assessments, inter-sectoral linkages between mining and other productive sectors can be built to ensure that duplications in policy are eliminated and mining's full contribution to SED is realised.

9.3.7 Regional Framework for Sustainable Mining Investments

The final recommendation is for a regional framework that guides sustainable mining investments for mineral economies. It was noted in Chapter Eight that regionalisation and harmonisation of investment code can limit the race to the bottom mentality, which is often pervasive in mineral economies in Africa. Here, it was suggested that the draft AU's PAIC which recognises PSONR can be used as the foundation to define a framework for mining investments. The ECA and AU in 2016 conducted a baseline study on harmonisation of mining fiscal regimes in Africa. However, with a broader mandate, such a regional mining investment framework spearheaded by the AMDC can guide mineral economies to make sound long-term decisions to enhance mining's positive impact on their economies. The reason for this recommendation is the fact that the AMDC is the implementing arm of the AMV and has the mandate to spearhead research in the minerals sector regionally. Since the PAIC recognises the PSONR, it will be expedient for the Centre to consider a regional approach to mining investment harmonisation in Africa.

Similar to the Organization for the Harmonization of Business Laws in Africa, where West African Member States have harmonised their business laws, the proposed *"Regional Harmonisation of Mining Investment Framework"* under PAIC can ensure

that mining countries harmonise their legal and fiscal frameworks. This will enhance greater regional integration and coherency in mining policies in Africa. Even for the Optimal Mining Investment Strategy, such a framework can guide the development of regional strategies in mining that are geared towards investment attraction. To recapitulate, as part of operationalizing the AMV for SED, a draft proposal on the need for regional harmonisation of mining investment frameworks and the recommendation of the ECA (2016b) study can be the premise to build a case for regional integration of investments. The regional elements are crucial to building competitive regional value chains for mining in Africa as was indicated in Chapter Eight.

9.4 Areas for Further Research

Based on the above recommendations and findings, the section discusses areas for further research, which were not covered in the Thesis. Tracing from the challenges of the market system and how SD came to cure the ills of the market, it was shown that the current interpretation of sustainability for mining is challenging. Two levels of interventions were suggested at the macroeconomic and microeconomic levels. The Thesis however, considered the national level intervention by justifying the need for an Optimal Investment Strategy anchored in a nation's development frameworks and industrial policies. In light of these, two areas for further research are advanced to support the SED view for mineral economies.

Firstly, future research should consider SED at the micro-economic level (or for industry). It was stated in Chapter Five that SD should be a national value system with SED instruments operationalised for the development of mineral economies and at the industry levels. Here, the AU or the AMDC can work on developing SED principles as a national value system for mining countries and the industry. Specifically, at the industry level in Africa, what SED protocols exist, are there effective standards and

metrics for monitoring sustainability at the microeconomic level, and in applying principles for SED and optimal mining at firm level, what should it mean for mining's productivity? Although Chapter Five alluded to what optimal mining means at the microeconomic (firm) level, it would be interesting for further studies to refine and devise industry level indicators and quantify the effects of applying optimal mining principles on a firm's productivity. Additionally, at the macro-economic level, what national level instruments besides investment and industrial policies specific to each country should be harnessed to spearhead the gold mining industry's competitiveness or mining generally? Because only four gold producing countries were covered for the study, it will be interesting to understand different mineral commodities in a broader study at the national and local levels. This is to close the loop in the process of SED for Africa's mineral economies.

The second area for further research is to justify from an economic perspective the impact of mining investment Strategies on a nation's growth path using macro-level data and statistics. It would be expedient to consider an econometric analysis and modelling of the situation in each of the case study countries, to reinforce the need for SED strategies in transitioning the concept of sustainability. For example, in recommending wealth funds under *Process 5* of IFRAD, what would be the effects of such a fund or a fund mechanism from metallic minerals on the SED of mineral economies in Africa in the medium to long-term? Will the economic case for SWFs from metallic resources be justified in countries like South Africa and Ghana, and what stake of mineral wealth is being set aside for future generations' development and growth? Although, these are political economy decisions by state actors, future research can investigate to determine whether the notion of wealth funds and special purpose vehicles for metallic resources are effective SED tools for Africa in the long-run.

9.5 Concluding Thoughts: Sustainable Development and Mining Investments

"Everybody wants development; but not everybody understands and accepts the basic requirements for development. The biggest requirement is hard work" (Nyerere, 1968, p.244, Freedom and Socialism). According to the first President of Tanzania, a basic requirement for development is hard work and "out of the box" thinking. For mineral economies, the playing field is rather advanced with being advantaged with mineral resources that can catapult a nation to development. The King of Saudi Arabia, King Faisal (1906- 1975) once said of the oil in the Emirates that *"in one generation we went from riding camels to riding Cadillacs. The way we are wasting money, I fear the next generation will be riding camels again."* (King Faisal in an interview with his Minister of Oil and Mineral Resources, Ahmed Zaki Yamani, cited in Brandreth, 2000).

These above quotes exemplify the view of this Thesis that mineral economies (RRA countries) must identify novel approaches and have the *political will* to ensure that mineral resources are used optimally for both present and future generations' benefit. However, as the discussions and assessments showed, African governments have been in a deficit in terms of translating their mineral wealth for SED. That said, (*Figure 9.3*) shows that major investments would lead to Africa (in the next 50 years) since the continent's share of *strategic* metallic minerals to the world is high compared to any other region (see Ernest and Young, 2013; USGS, 2012).

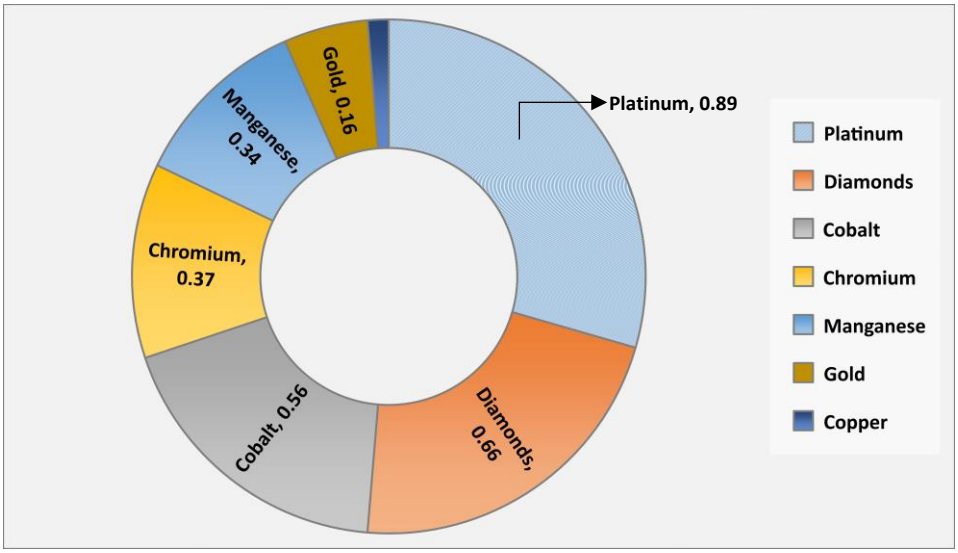


Figure 9.3: Africa's Share (%) of Metallic Resources in Relation to the World

Sources: Adapted from Ernest and Young (2013) and USGS (2015, 2012)- Minerals Year Book

What should mineral economies in Africa do? The view of SED as shown in the Thesis is one way of re-interpreting SD for countries highly dependent on minerals for growth. Chapter Five's exposition on the concept of optimal mining and SED should warrant further research into new ways of making mining competitive in the Africa region *vis-à-vis* the world. This means a consideration of new technologies in mechanisation and automation for mining in order to cause no harm, equipping workers with the requisite skills, and advanced qualifications to handle the next level of innovation in mining.

At the national level, governments need to be strategic in how they assert PSONR to define a fairer deal in the share of mineral resources. The recent trend involves setting new regulations, which call for transparent regimes- tax declarations, increase in royalty on metallic resources and fairer bargain in the elements of the MDAs. However, although these approaches may be warranted, it is a tricky balancing act between serving the interest of investors and ensuring that governments obtain a fair share in

light of the socio-economic deficits in their countries. Caution must be taken due to the long-term effects such approaches have on a country's sovereign risk profile and competitiveness in the face of uncertainty and volatility of mineral prices and demand and supply factors. Moreover, as was indicated as a requirement for IFRAD, the technical expertise and capacity to manage the mineral economy and administer mining rents are vital if mining is to have a transformative impact on economies in Africa. Educational programmes and reforms in social and physical sciences (particularly in science, technology, engineering and mathematics) specific to the needs of the mineral economy must be available; coupled with mining administration training for State and political actors to build their capacity in the governance of the minerals sector.

A subtle way to obtain much benefits from minerals is to be able to identify a country's needs as well as mining's needs and devise effective frameworks and plans, which capitalise on a country's comparative advantage for competitiveness. What was noted (as gaps) and suggested in the Thesis was that gold mining countries do not have effective LC strategies or policies that can enhance critical mineral sector linkages and the necessary requirements for down and up-stream value addition. As custodians of mineral wealth, the onus lies on this generation to ensure that mineral wealth is equitably used and equally shared between current and future generations. Thus, LC strategies must be well devised together with a country's investments and industrial policies; and must be strategically positioned to facilitate local economic development within mining communities and for national economic development. Additionally, LC strategies must be in synch with fiscal frameworks by ensuring transparency in the share of mineral revenues and transparency on the part of MNCs. In buttress to this view point, Deloitte (2017), *tracking trends*, have acknowledged that a step in this direction is corporative dialogue and partnerships that create shared value and repairs the broken trust relations between governments and miners.

At the regional level, although the AMV has fast tracked a mining-led growth agenda for mineral economies (through the country mining visions), there is more to be done if the African people behind the vision aim to achieve the tenets of the vision. Just on the first tenet of *"a knowledge-driven African mining sector that catalyses & contributes to the broad-based growth & development of, and is fully integrated into, a single African market"* (AU, 2009; p. v); it requires a regional integration framework for investments. This is because regional agglomeration effects can quickly enhance downstream and upstream linkages needed in mining. Hence, it was recommended that the PAIC be used as the foundation to build a continental mining investment framework for mineral economies in Africa. The institutional mechanism exists with the AMDC and the African Union who can spearhead the case and the eventual development of the framework for the regionalisation of mining investments. This would ensure better gains regionally, and as well benefits from a harmonised Optimal Mining Investment framework at the national level.

Finally, SD and mining investments remain dynamic and the goal post for achieving SD ends keep changing. Thus, the requisite partnerships between companies, communities and governments must be strengthened with innovative approaches to solving problems in mining and the economy. It would be essential to include communities in the mines' integrated set-up and ensure that forward-looking policies in digitizing the mining process are understood and adopted by policy makers. At the core of SD is integration and as was argued in the Thesis, for mineral economies in their current of stage of development, an SED goal that is measurable and creates shared value for all stakeholders is the way forward for the development of the mining sector in RRA countries.

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Table of Annexes

Chapter 1

Annex 1.1: Classification of Resource-rich Countries in Sub-Saharan Africa

(Non) Resource-rich Countries	Resource-rich (non-oil) Producing Countries	Resource-rich Oil Producing Countries
Benin	Botswana	Angola (Oil and Diamonds)
Burundi	Burkina Faso	Cameroon
Cabo Verde	Central African Republic	Chad
Comoros	Cote d'Ivoire*	Republic of Congo
Eritrea**	DRC	Equatorial Guinea
Ethiopia**	Ghana*	Gabon
Gambia, The	Guinea	Nigeria
Guinea-Bissau	Liberia	Sudan
Kenya**	Mali	South Sudan
Lesotho	Mauritania	
Madagascar**	Mozambique	
Malawi	Namibia	
Mauritius	Niger	
Rwanda	Sierra Leone	
Sao Tome and Principe	South Africa	
Senegal	Tanzania	
Seychelles	Zambia	
Somalia	Zimbabwe	
Swaziland	Post-2014	
Togo	Eritrea**	
Uganda	Ethiopia**	
	Kenya**	
	Madagascar**	

Sources: Data from World Bank (2016); IBIS (2014); Lundgren *et al.* (2013)
Malawi, Rwanda and Uganda are in the initial stages of developing their minerals sectors.

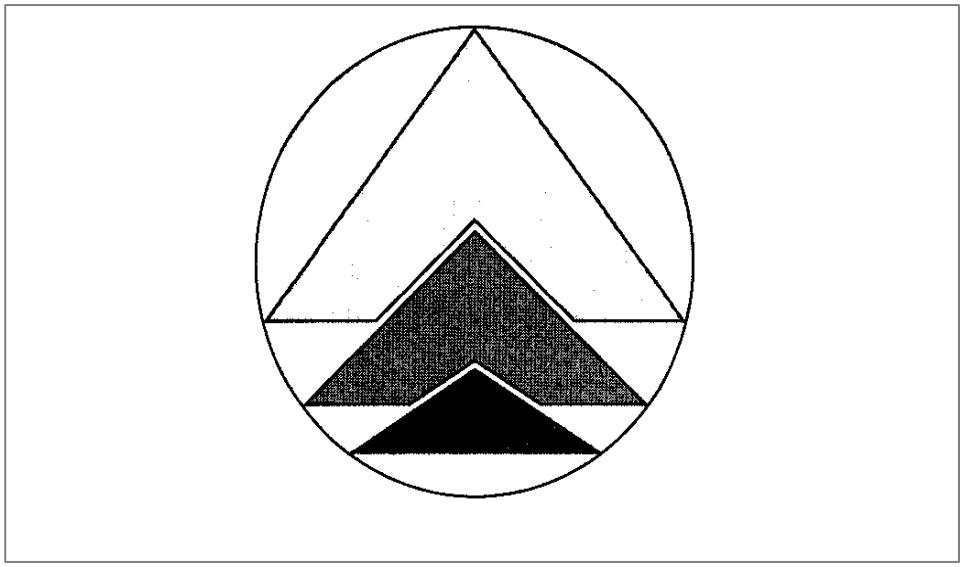
Explanation for the Classifications

The Thesis employed (IMF, 2012b; Lundgren *et al.*, 2013) classifications to define resource-rich and non-resource rich countries. From the table, resource-rich countries have 25 per cent or greater of their exports merchandise from mineral resources. Non- resource-rich countries have lower than 25 per cent of their exports and mineral revenues relative to output. For non-resource-rich countries, they usually produce minerals on a small-scale level and have no significant mineral discoveries. For 'oil producers', this included traditional oil producing countries as shown in table, coupled with South Sudan.

* Cote d' Ivoire and Ghana although recently started producing oil are still classified as resource-rich countries (non-oil) producers for the purposes of the Thesis. Ghana for instance is a major gold producer as well as Cote d' Ivoire.

** Eritrea, Ethiopia, Kenya and Madagascar have recently (from 2014) started exploring large-scale mining/ oil and gas and have proven reserves of commercial production of minerals; hence, the classification as resource-rich countries (see also IBIS, 2014).

Annex 1.2: The Symbol on the World Conservation Strategy Report in 1980



Source: IUCN (1980; p. i)

The above diagram is extracted from the World Conservation Strategy report (see IUCN, 1980). It consists of three arrows within a circle. The circle represents the biosphere, while the arrows refer to the aims of the Strategy which were: maintenance of essential ecological processes and life-support systems; preservation of genetic diversity; and sustainable utilization of species and ecosystems. The focus on ecological preservation in the report represented one of the earliest views on environment and development.

Chapter 3

Annex 3.1: Some Sustainable Development Initiatives in Mining

A List of Common International Voluntary Initiatives for SD of Mining			
Initiatives		**Definition**	**Sources**
1	Occupation OHSAS 18001	Occupation Health and Safety Assessment Series 18001, abbreviated as OHSAS 18001 is a standard for health and safety management systems in an organisation. It is aimed at assisting organisations to control, monitor and manage occupational health and safety risk.	Certification Europe (2017)
2	International Organization for Standardization (ISO) 26000	ISO 26000 is an international standard to assist organisations to effectively assess and address vital social responsibilities of relevance to the aims and objectives for setting up the company. Companies work with core and wider stakeholder base who are integral to the functioning of the core process of the business, to ensure that all operations and processes are within the ambit of the mission and vision of the company.	International Organization for Standardization (2010)
3	Natural Resource Charter (NRC)	The NRC is a practical 12 precepts stage wise translation of policy options and guidance for governments, societies and the international community on managing natural resources. It draws on the wide experiences of other resource economies into it precepts. It begins with strategic planning into a mineral-led economy, exploration, taxation, SD dimensions, revenue governance and the management of the role of the international community in the extractive sector.	NRC (2014); NRGI (n.d.)
4	ICMM SD Principles	The ICMM SD framework is based on the 2-year Mining Metals and Sustainable Development Project in 2002. At the heart of the SD framework is how mining activity can operate so that positive long-term net benefits can be ample for human well-being and the ecosystem. 10 principles were developed to facilitate mining's contribution to sustainability by mining companies.	ICMM (2003)
5	Extractives Industry Transparency Initiative	The EITI is aimed at ensuring that natural resource revenues especially from mining, oil and gas are transparent, to encourage accountability between the key actors of government, extractive companies and citizens.	EITI (2013)
6	UN Global Compact	The UN Global Compact is a principle-based framework for ensuring that its ten principles are upheld by business and operations in the areas of human rights, environment, labour, anti-corruption, social and environmental ethics, amongst others in conducting business operations.	UN (2002)
7	ISO TSF 14001	ISO 14001 and its Tailings and Storage Facility frameworks set out criteria for environmental management systems. According to the ISO (2015), it maps out a framework that a company or organisation can follow to set up an effective environmental management system, particularly in tailings storage and management.	ISO (2015)
8	International Cyanide Management Code (ICMC)	The ICMC is a voluntary programme for cyanide management designed to assist the gold mining industry, producers and transporters of cyanide, which is used in gold extraction. The programme aims to improve cyanide management practices and demonstrate the compliance of gold mining companies in cyanide usage and management. Compliance with the standard ensures that the potential harmful and wasteful effects of cyanide are limited on the environment, as well as on people.	International Cyanide Management Code (n.d.)
9	ISO 50001- Energy management system	ISO 50001:2011 on energy management systems provides guidelines and requirements for efficient and effective energy usage by organisations through the life cycle of the business. Prior to receiving certification, organisations are assisted in the development of an energy management system to ensure reductions in different sources of energy.	ISO (2011)
10	Carbon Disclosure Leadership Index	The CDP "Carbon Disclosure Project" from which is derived the CDLI is an assurance mechanism for carbon disclosure reporting by different industries and sectors. The CDP reporting is based on a set of specific questions on carbon emission on scope 1, 2 and 3, by companies and the measures taken by these organisations to minimize the impact of their activities or limit their carbon footprint on the environment. The CDP works with organisations to disclose	CDP (n.d.)

		the greenhouse gas emissions and after rank the transparency of the reporting on an index.	
11	Global Reporting Initiative (GRI)	The GRI is a reporting tool with global acceptance intended to serve as a framework for reporting on an organisation's SD performance. The aim of this reporting tool is to aid in benchmarking against industry standards and performance with respect to SD laws and initiatives and codes of conduct and norms	Global Reporting Initiative (2013)

Several Sources: Included in the Table

Annex 3.2: Global Sustainable Development Goals

Sustainable Development Goals (Agenda 2030)	
Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote well-being for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reserve land degradation and halt bio-diversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalise the global partnership for sustainable development

Sources: United Nations (2015a, 2015b)

Annex 3.3: Sustainability Views and the North and South Perspectives

The table outlines the characteristics, ethics, the geographical perspective of the two main views of sustainability and their variations, i.e. very weak and very strong forms of sustainability.

Sustainability labels	Weak sustainability	Strong sustainability	Very strong sustainability	Very weak sustainability
Management strategies	Modified economic growth-adjusted green accounting; Substitutability of natural capital-under the constant capital rule	Zero economic growth and zero population growth; heavy regulation of the environment through macroeconomic policy; No increase in the scale of growth from natural resources	Reduced scale of the economy and population; natural capital should remain intact and not used-preservationist position in the management of the economy	Maximised economic growth (GDP and GNP) and development with some care for the environment.
Ethics	Extended care of the environment while inter and intra equity is factored into resource use and distribution. Ethical reasoning based on caring for others is incorporated	Collective group interests take precedence over those of the individual (global over local); primary value is placed on the ecosystem's wellbeing and all human activity is secondary	Acceptance of bio-ethics; intrinsic value conferred on nature over that of human's	Atypical property rights under the market systems; traditional ethical reasoning. Individual rights are important-instrumental value- recognised value of humans in nature
Geographical Perspectives	Developed North	Developed North	Developed North	Developing South

Source: Modified from (Pearce, 1994)

Chapter 4

Annex 4.1: Gold Production Quantities in RRA Countries

Second Criteria (Gold production> 10,000kgs)		
17 Resource-rich Countries (in SSA)	**2014 Production estimates of Gold above (10,000 kilogrammes)**	**Gold Mining Countries that qualified for the next selection criteria**
TIER ONE		
Botswana	884	Ghana (90,754kg)
Burkina Faso	36,199	Tanzania (40,481kg)
Eritrea	1,000	Burkina Faso (36,199kg)
Ethiopia	12,500	Ivory Coast (17,318kg)
Ghana	90,754	Ethiopia (12500kg)
Ivory Coast	17,318	
Madagascar	160	
Mozambique	180	
Namibia	1,938	
Tanzania	40,481	
Zambia	5,000	
TIER TWO		
Democratic Republic of Congo (DRC)	32,000	South Africa (151,618kg)
Guinea (Conakry)	16,955	Mali (39,724kg)
Mali	39,724	DRC (32,000kg)
Niger	732	Guinea (Conakry) (16,955kg)
South Africa	151,618	Zimbabwe (14,500kg)
Zimbabwe	14,500	
**Kenya is eliminated in the first stage		

Source: USGS (2015)

Annex 4.2: Matrix of SD Indicators at the National Level

The Matrix of SD indicators at the macroeconomic level comprises of (23) core indicators in the first column and (39) specific indicators. The specific indicators consist of (14) economic indicators, (7) environmental indicators, and (18) social indicators. The matrix also illustrates the broad global-regional-national issues, which the indicators cover. The specific indicators have been narrowed to only indicators that are measurable from the issues column in the Table.

Matrix of Sustainable Development Indicators at the National (or Macroeconomic) Level

CORE INDICATORS (CI)	SPECIFIC INDICATORS	ISSUES	NUMBER OF INDICATORS
ECONOMIC SYSTEM (E)			
E 1: **Macroeconomic Stability**	E 1.1: GDP; Effectiveness of economic policies and the business environment.	Growth Policies- Fiscal, Taxation, Investments; FDIs; GDP; General Accounts.	**1**
E 2: **Investments into Capital Development**	E.2.1: Investments into education and health; social investments into communities and nation. E 2.2: Research and development, and science, technology and innovation. E.2.3: Net Savings.	SD Concerns (mainly investments into any social project is considered as economic spending hence captured in this section)- Economic Development, Poverty Alleviation; Investments into Development Projects- Road and Railway Systems Public Works; Capital Infrastructure Development; Employment Creation; Social Investments into Communities; Social Infrastructure Mining R & D, Science Technology Innovation Policies, Cleaner Technologies and Production.	**3**
E 3: **Resource Nationalism (RN) Issues**	E 3.1: Perceptions of stability in the mineral regime and investments.	Considers mining industry players' view of government approaches to RN issues such as: uncertainty over environmental regulations, regulatory duplications, legal systems and tax regimes; Other issues include: 1. Mandated Beneficiation; 2. Greater Stake in Companies; 3. Increasing Taxation (Royalties, Corporate Taxes); 4. State Ownership; and 5. Nationalisation of mines.	**1**

E 4: **Mining Sector Linkages**	E 4.1: Local beneficiation strategies; Legal requirements for local procurement and supply chain. E 4.2: Legal requirements for local procurement and supply chain.	Policy coherence of the mineral policy framework with other sector policies; Local beneficiation policy; Procurement and local supply chain.	**2**
E 5: **Transparency and Management of Revenues**	E 5.1: General revenue management; Minerals revenue management; Transparency and benefit sharing (mineral revenues).	Public revenue management; Transparency in the use of mineral rents; Equitable distribution of revenues and wealth (benefit sharing) with communities.	**1**
E 6: **ASM (Economic) Issues**	E 6.1: Legal recognition of the contribution of ASM to GDP; legal provisions safeguarding their interest/ signatory to the regional Yaoundé vision.	Incoming revenues from ASM; legal provisions for ASM as an economic activity.	**1**
E 7: **Sustainable Production**	E 7.1: Net Adjusted Savings	Sustainable production and consumption of natural resources.	**1**
E 8: **Trade and Investment**	E 8.1: Trade Integration E 8.2: Trade Intensity E 8.3: Trade Policy Openness E 8.4: Existence of investment funds from mining rents.	Intra-regional trade with other African countries and trade with developed countries; Bilateral agreements and investments.	**4**
NATURAL SYSTEM (N)			
N 1: **Effective Environmental Regulations**	N 1.1: All environmental regulations and laws, which deal with environmental pollution: 1. Cumulative national air emissions; 2. Water; 3. Land degradation (pollution); 4. Nuisance; 5. Climate change; 6. Biodiversity protection.	Nuisance, air and water quality; land degradation, biodiversity, etc.	**1**
N 2: **Environmental Quality**	N 2.1: GHGs, climate change; Quality of water and river bodies; Biodiversity damage; Land degradation	Energy usage and emissions- Ghgs, co2; Water, air and land pollution; Wastes- liquid effluents and leachates; AMD; Biodiversity and habitat loss.	**1**

N 3: **Sustainable Natural Resource Management**	N 3.1: Natural Resource management systems	Water - Use, Security of Supply and Recycling; Protection of the Natural System- Forest Reserves and Land; Land Use; Environmental Management and Monitoring Systems; Post-Mine Rehabilitation and Strategic Planning; Waste Management	**1**
N 4: **Mine Closure**	N 4.1: Planning for mine closure	Environmental plans and strategies for closure.	**1**
N 5: **ASM (Environmental) Issues**	N 5.1: Mercury emissions into air, soil and water; Land degraded as a result of ASM; Contaminated water bodies as a result of siltation and mercury, etc.	ASM Pollution- mercury; Land degradation; Regulations and management.	**1**
N 6: **Knowledge of Mineral Reserves and Resources**	N 6.1: Known mineral resources and reserves	Knowledge of available mineral reserves; Horizon- effective life span until exhaustion.	**1**
N 7: **Compliance on Global and Regional Environmental Sustainability Frameworks**	N 7:1. Adherence to Global Environmental Frameworks, voluntary standards and initiatives.	International standards and compliance.	**1**
SOCIAL SYSTEM (S)			
S 1: **Governance**	S 1.1: Governance and institutional quality	Institutional quality; Voice and accountability; Good governance; Civil and political rights.	**6**
S 2: **Quality of Life**	S 2.1: Standard of living S 2.2: Peace and security	Standard of living; Welfare; Human development- income, health, quality of education; Job security and labour entitlements; HRD- education, training and skills development.	**2**
S 3: **Gender Equality and Empowerment**	S 3.1: Gender equality and empowerment	Women's empowerment; Equality in terms of access to resources- income, wealth and healthcare delivery services; Social and political participation in all aspects of family, society and national governments.	**1**

S 4: **Human Rights Concerns**	S 4.1: Civil liberties S 4.2: Political rights	Equal opportunity and non-Discrimination; Social inclusion; Equality; Participation; Legal frameworks backing employee and worker rights.	**2**
S 5: **Legal Provisions for Corporate Social Responsibility**	S 5.1: Existence of CSR legal provisions S 5.2: Elements within CSR considered	As a legal obligation by Companies; CSR institutionalised in legal frameworks.	**2**
S 6: **Local Content Legislations**	S 6.1: Existence of local content legal provisions S 6.2: Local content provisions considered	Job provision; labour quota of locals in employment; Inclusive development; Procurement and enterprise development; measures to deal with historical legacies; Health and safety.	**2**
S 7: **Social Cohesion and Socio-economic Development**	S 7.1: Social cohesion S 7.2: Socio-economic Development	Community development - state of urban and rural development and local government relations; Preservation of culture and indigenous peoples' rights; Social Licence to Mine.	**2**
S 8: **Compliance on Global Voluntary Social Initiatives and Frameworks**	S 8.1: Ratified multilateral treaties (on all UN Human Rights frameworks)	Ratifications on UN multilateral treaties on human rights concerns.	**1**

Sources: Researcher's Synthesis of Global, Regional and National SD Reports; References can be found in *Table 4.6* of Chapter Four

Annex 4.3: Elements for SD Measurements under Economic System

ECONOMIC SYSTEM (E)			
Themes	**Definitions of Indicators/ Assessment Elements**		**Sources**
E 1: Macroeconomic Stability	E1: World Bank's Country Policy and Institutional Assessment (CPIA)- Macroeconomic Stability	The CPIA's cluster (A) assessment of economic management were used for the SD assessment. The average for a stable macroeconomic environment such as: sound fiscal policy, monetary policy, debt policy and structural policies were assessed and then averaged for E1.	World Bank (2017)
	E1: World Economic Forum (WEF)- Macroeconomic Stability Pillar	On occasion, the WEF's pillar on macroeconomic stability (scores) used in the construction of the Global Competitiveness Index was used for the macroeconomic stability in calculating the SD index for DRC. Per the WEF (2016), the pillar evaluates the stability of the macroeconomic environment for governments, so it does not directly take into account the way in which public accounts are managed by the government.	WEF (2016)
E 2: Investments into Capital Development	E2: Gross Fixed Capital Formation	Gross fixed capital formation (formerly gross domestic fixed investment) is defined to include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings by the World Bank. This was key in measuring investment into capital development of the countries which were assessed.	World Bank (2015)
	E2: WEF's Innovation Pillar	The WEF's innovation pillar considers investments of countries in research and development (R&D), interlinkages in research between the private sector, governments, knowledge-based institutions, and venture capitalists. Per the WEF (2016), the presence of high-quality scientific research institutions that can generate the basic knowledge needed to build and enhance newer technologies between universities and industry is a corner assessment of this pillar. As a result, the pillar's scores was part of the indicators for E2 'investments into capital development'.	WEF (2016)
E 3: Resource Nationalism (RN) Issues	E3: Policy Perception Index (PPI)	The PPI was used because it presents a report card of the stability of mineral regimes in order to secure investments for minerals development. It tests the attractiveness of mineral regimes and in essence measures the state of resource nationalism in mining countries. Hence, the proxy was used as a powerful measure of how nationalism efforts have affected regimes requirements for mineral development.	Jackson and Green (2015)

E 4: Mining Sector Linkages	E4.1: Local beneficiation Strategy	Are there legal provisions encouraging beneficiating locally? (Y/N) Ranked (Yes, 100 and No- 0); and 1. Are legal requirements for local beneficiation adequately outlined in the mineral regime? 2. Are there plans and strategies for local beneficiation enforced in the mining regulation? 3. In terms of strategies and plans for local beneficiation, are they reviewed frequently? 4. Are there monitoring mechanisms for local beneficiation in place, such as benchmarks, targets and incentives? Strategies based on the questions are ranked: (100- Yes, 75- To greater extent, 50- Average consideration, 25- To a lesser extent, 0- No)	National Documents
	E4.2: Local supply chain strategy	Are there legal requirements for local procurements for mining supply chain? (Y/N) Ranked (Yes, 100 and No- 0); and 1. Are legal requirements for local procurement and supply chain adequately outlined in the mineral regime? 2. Are there plans and strategies for local procurement and supply chain enforced in the mining regulation? 3. In terms of strategies and plans for local procurement and supply chain, are they reviewed frequently? 4. Are there monitoring mechanisms for local procurement and supply chain in place, such as benchmarks, targets and incentives for local procurement and supply chain? 5. Do local authorities in mining communities include plans and strategies to enhance local procurement and supply chain requirement in their development planning? Strategies based on the questions are ranked: (100- Yes, 75- To greater extent, 50- Average consideration, 25- To a lesser extent, 0- No)	National Documents
E 5: Transparency and Management of Revenues	E5: Resource Governance Index (RGI)	The RGI measures the quality of governance in 58 resource and oil-rich countries in the world. According to NRGI (2015), the Index which was developed by the Institute aims to assess the following: institutional and legal setting; reporting practices; safeguards and quality controls; and enabling environment for effective mineral governance and management of mineral wealth. Only the enabling environment dimension was used to measure the management of pubic mineral revenues and transparency under E5.	NRGI (2015)

E 6: Artisanal and Small-scale Mining (ASM) (Economic) Issues	E6: Regimes provisions ASM Development	1. Are there provisions which legalise all types of artisanal, small and medium scale mining activities in the mineral regime? 2. Are there legal provisions enhancing the economic impact of ASM through skills development, training and optimising ASM as a business in the mineral regime? Based on provisions of the mining regime and jurisdiction requirements and best practice 3. Have there been medium to long term funds set up for enhancing the economic opportunities of ASM activities and their communities in the mineral regime? 4. Are there M&E protocols to check non-compliance ASM Operators in the mineral regime? Strategies based on the questions are ranked: (100- Yes, 75- To greater extent, 50- Average consideration, 25- To a lesser extent, 0- No)	National Documents
E 7: Sustainable Production	E7: Net Adjusted Savings	Net adjusted savings was used to measure the nature of sustainable production vis-à-vis net savings of mineral depletion from mineral economies. The indicator measures net savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide and particulate emissions damage.	World Bank (2015)
E 8: Trade and Investment	E8.1: ECA's Africa Regional Integration (ARI) Index	The ARI Index by the ECA was used to measure the integration agenda of the four countries used in the assessment. The ARI measures Africa's integration on a number of dimensions, i.e. regional infrastructure; trade integration, financial and macro-economic integration; free movement of people; productive integration.	AU-AfDB-ECA (2016)
	E8.2: Merchandise Trade (%) GDP	Merchandise trade as a share of GDP is defined as the sum of merchandise exports and imports divided by the value of GDP, all in current U.S. dollars (World Bank, 2015). This indicator was used to measure the nature and volume of trade intensity within mineral-rich economies.	World Bank (2015)
	E8.3: CPIA's Trade Policy Openness	Per the World Bank (2013), the CPIA's Trade Policy Criterion covers two parts. The first part seeks to measure the extent to which a country supports regional organisations and its commitment to economic cooperation and regional integration initiatives. The second part focuses on trade and covers two areas: (a) trade regime restrictiveness focusing on the height of tariffs barriers, the extent to which non-tariff barriers (NTBs) are used, and the transparency and predictability of the trade regime; and (b) customs and trade facilitation, including the extent to which the customs service is free of corruption, relies on risk management, processes duty collections and refunds promptly, and operates transparently. The indicator assisted in assessing the soundness of trade policy to enhance a regional integration agenda for the mineral economies with other states in Africa	World Bank (2017**)**
	E8.4: Existence of a Fund from Mineral revenues	Is there existence of a fund from mineral revenues for long term development? Ranked (Yes, 100 and No- 0)	National Documents

Sources: Included in the Table; National Documents- Mining Laws: local content and Labour Laws

Annex 4.4: Elements for SD Measurements under Natural System

ENVIRONMENTAL/ NATURAL SYSTEM (N)			
Themes	**Definitions of Indicators/ Assessment Elements**		**Sources**
N1: Effective Environmental Regulations	N1: Are there in existence national environmental regulations frameworks to support environmental protection?	Environmental regulations for: - Cumulative National Air Emissions - Water - Land Degradation (Pollution) - Nuisance - Climate Change - Biodiversity Protection Ranked (Yes- 100, No- 0)	National Documents
N2: Environmental Quality	N2: Environmental Performance Index (EPI)	The EPI measures the impact of the environment on the health of humans and the health and wellbeing of the eco-system. Some of the indicators measure: air quality, air pollution, water and sanitation, safe drinking water, the ecosystems vitality, etc. To assess the quality of the environment and its impact vis-à-vis national regulations, the EPI was used as the proxy for environmental quality.	YCELP (2014)
N3: Sustainable Natural Resource Management	N3: Natural Resource Management Strategies	1. Are there any sustainable land and water management strategies in place or other natural resource management systems? Y/ N (Scaled 1- 10) Based on provisions of the mining regime and jurisdiction requirements and best practice 2. Are there legal provisions which support the integration of NRM in all development policies? Y/N 3. Are there M&E protocols to check non-compliance on NRM strategies? 4. Have there been national benchmarks/ and targets which have been set for the six variables: emissions, water, land degradation, biodiversity, climate change and Nuisance for mining? 5. Are environmental mgmt. fund for rehabilitation of mining site and communities in the mineral regime? 6. Are there NRM strategies and initiatives by governments to check impact- waste, emissions, water, and land degradation from mining industry on the environment? Strategies based on the questions are ranked: (100- Yes, 75- To greater extent, 50- Average consideration, 25- To a lesser extent, 0- No)	National Documents

N4: Mine Closure	N4: Planning for Mine Closure	1. Are legal requirements for post-mine closure adequately outlined in the mineral regime? 2. Are there plans and strategies for post mine closure enforced in the mining regulation? 3. In terms of strategies and plans for post-mine closure, are they reviewed frequently? 4. Are there monitoring mechanisms for post-mine closure in place? 5. Do the national and local authorities include the scenario of closure in their development planning? 6. Are provisions being made from the benefits of mining to support development initiatives for mine closure at the local level? Strategies based on the questions are ranked: (100- Yes, 75- To greater extent, 50- Average consideration, 25- To a lesser extent, 0- No)	National Documents
N5: ASM (Environmental) Issues	N5: Regimes provisions for regulating ASM environmental issues are assessed by a series questions.	1. Are there legal provisions which support the integration of ASM activities in all development policies? Y/N 2. Are there legal provisions regulating the environmental impact of ASM activities? Y/ N (Scaled 1- 10) Based on provisions of the mining regime and jurisdiction requirements and best practice 3. Have there been national benchmarks/ and targets which have been set for the six variables: emissions, water, land degradation, biodiversity, climate change and Nuisance for regulating ASM activities? 4. Are environmental mgmt. plans/ fund required for operation by ASM operators on mining site and communities in the mineral regime? 5. Are there NRM strategies and initiatives by government to check the impact of- waste, emissions, water, land degradation from ASM activities on the environment? 6. Are there M&E protocols to check non-compliance on NRM strategies for ASM? Strategies based on the questions are ranked: (100- Yes, 75- To greater extent, 50- Average consideration, 25- To a lesser extent, 0- No)	National Documents
N6: Knowledge of Mineral Reserves and Resources	N6: Robust knowledge about know resources and reserves in the mineral regime	1. Is there knowledge of all known mineral resources and reserves? 2. Have all minerals and the extent of the resources and reserves been mapped out? 3. Is there knowledge of probable gold ore reserves in the regime? 4. Is there knowledge of proven gold ore reserves in the regime? 5. Are there long-term plans ensuring the sustainability of the reserves for future generations? 6. Do you have a mineral management regulation to deal with revenues from gold? Knowledge of reserves and resources based on the questions are ranked: (100- Yes, 75- To greater extent, 50- Average consideration, 25- To a lesser extent, 0- No)	National Documents

N7: Compliance on Global and Regional SD Frameworks	N7: Status and Ratification of Global and Regional Frameworks Signed and Ratified (1), Not Signed (0), Signed but not Ratified (0.5)	Global Frameworks: Have you signed and ratified the following environmental frameworks? - The Convention on Biological Diversity - The United Nations Convention to Combat Desertification - The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal - Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movements of Hazardous Wastes Within Africa - The United Nations Framework Convention on Climate Change (UNFCCC) - The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) - The Kyoto Protocol to United Nations Framework on Climate Change - The Vienna Convention for the Protection of the Ozone Layer - The Montreal Protocol on Substances that deplete the Ozone Layer - The Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora - The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade - The Stockholm Convention on Persistent Organic Pollutants (POPs) - The Cartagena Protocol on Biosafety - Cancun Adaptation Framework - Minamata Convention - SDGs - Paris Agreement	Documents from the United Nations' and the African Union's Repositories on Signed and Ratified Environmental Agreements (AU, 2015b; OHCHR, 2015)

Sources: Included in the Table; National Documents- Mining Laws: Environmental Regulations; SD and Mining frameworks.

Annex 4.5: Elements for SD Measurements under Social System

The metrics, comprising of indexes of relevant to RRA countries and elements to be considerd for ranking and assessment in mining legislation are presented in the following tables.

SOCIAL SYSTEM (S)			
Themes	**Definitions of Indicators/ Assessment Elements**		**Sources**
S1: Governance	S1: Worldwide Governance Indicators (WGI)	The WGI measures the nature of governance across six dimensions- these are (Voice & Accountability, Political Stability and Lack of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption). These indicators were the prime indicators for measuring quality of governance and were aggregated under S1.	UNDP (2016); World Bank- WGI (2015)
S2: Quality of Life	S2.1: Human Development Index (HDI)	The Human Development Index (HDI) is a key welfare measure that is composed of an aggregation of a country's life expectancy, education, and per capita income indicators into a single composite index. (Scored on 0- 1 scale). This was used to assess quality of life.	UNDP (2016)
	S2.2: Global Peace Index (GPI)	The GPIs indicators on peace and safety were used as a proxy for the collective wholeness of a country. The GPI consists currently of 22 indicators seeking to measure global peace based on: levels of safety and security in society; the extent of domestic and international conflict; and the degree of militarisation. The index measures the extent to which civil and political rights are sound in a country. Some of the broader issues that it aims to measure are: low crime rates, terrorist acts and violence, violent demonstrations, stable political atmosphere, harmonious relations with neighbouring countries, the proportion of a population being internally displaced, amongst others. This is scored on 1- 7 scale.	Institute for Economics and Peace (2015)
S3: Gender Equality and Empowerment	S3: Gender Inequality Index (GII)	To measure the state of gender and women's empowerment, the GII was used. The GII tries to measure the level of inequality between females and males, in terms of achievements in empowerment and economic status. It thus reflects the nature of dis-empowerment amongst women in a country. It sometimes shows the relative position of women to men in areas of women's health issues according to the UNDP (2015).	UNDP (2015)
S4: Human Rights Concerns	S4: Freedom House Indicators (FHI)- Political Rights and Civil Liberties	In terms of human rights concerns, the FHI which measures the state of democracy, civil and political rights of countries was used as the proxy for S4. The FHI is a survey conducted to measure freedom— in terms of the opportunity to act without control of the government and other inherent and	Freedom House (2015)

		external forces of dominance over an individual or collective's rights. The FHI measures two dimensions of freedom- political rights and civil liberties. According to the Freedom House (2015), political rights enhances people's ability to participate freely without restraint or pressure in political processes.	
S 5: Legal Provisions for Corporate Social Responsibility	S5.1: Are there in existence CSR Provisions in the legal frameworks? Ranked (Yes- 100, No- 0)	S5.2: Do the CSR provisions consider: - Community and socio-economic development - Reclamation - Reforestation - Promotion of Cleaner Technologies - Education - Health - Sports and Youth Development - Cultural Enhancement - HRD- CPD - Provisions for Collective Bargaining - Company and Employee Relationships - Job Security - Ranked (Yes- 100, No- 0)	National Documents
S 6: Local Content Legislation	S6.1: Are there in existence Local Content Provisions in the legal frameworks? Ranked (Yes- 100, No- 0)	S6.2: Do the Local Content provisions consider: - Building Local Infrastructure - Community Development - Employment- Job Creation - Community Development Fund - Community Involvement and Relationships - Local Procurement & Enterprise Development - Technology Transfers - Research and Development - Training and Skills Development - Local Content Plan - Monitoring and Evaluation Ranked (Yes- 100, No- 0)	National Documents
S7: Socio-economic Development and social Cohesion	S7.1: CPIA- Social cohesion	The CPIAs cluster on social cohesion, which assesses the soundness of policies for social inclusion / equity, Equity of Public Resource Use, Building Human Resources and Social Protection and Labour were grouped for the SD assessment.	World Bank (2017)
	S7.2: Africa Infrastructure Development Index (AIDI)	The AfDB's Africa Infrastructure Development Index (AIDI) was used as a proxy for measuring infrastructure development. The AIDI aims to monitor the status and progress of infrastructure development across the continent on four major components: (i) Transport; (ii) Electricity, (iii) ICT, and (iv) Water & Sanitation. It is scored on 0- 100 scale.	AfDB (2016)

S 8: Compliance on Global Voluntary Social Initiatives and Frameworks	S8: Status and Ratification of Global and Regional Human Rights Frameworks was the proxy. The assessment was scored base on: (Signed and Ratified (1), Not Signed (0), Signed but not Ratified (0.5)).	Global Frameworks: Have you signed and ratified the following global human rights frameworks? - International Convention on the Elimination of All Forms of Racial Discrimination :1969 - International Covenant on Civil and Political Rights :1976 - Optional Protocol to the International Covenant on Civil and Political Rights :1976 - Second Optional Protocol to the International Covenant on Civil and Political Rights, aiming at the abolition of the death penalty: 1991 - International Covenant on Economic, Social and Cultural Rights: 1976 - Optional Protocol to the International Covenant on Economic, Social and Cultural Rights; 2013 - Convention on the Elimination of All Forms of Discrimination against Women :1981 - Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women: 2000 - Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment: 1987 - Optional Protocol to the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment: 2006 - Convention on the Rights of the Child :1990 - Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict: 2002 - Optional Protocol to the Convention on the Rights of the Child on the sale of children, child prostitution and child pornography: 2002 - Optional Protocol to the Convention on the Rights of the Child on a communications procedure: 2014 - International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families :2003 - International Convention for the Protection of all Persons from Enforced Disappearance: 2010 - Convention on the Rights of Persons with Disabilities: 2008 - Optional Protocol to the Convention on the Rights of Persons with Disabilities :2008	Regional Frameworks: Have you signed and ratified the following regional human rights frameworks? - African Convention on the conservation of nature and natural resources - African Charter on Human and Peoples Rights - Revised African Convention on the Conservation of Nature and Natural Resources Documents from the United Nations Human Rights Office of the High Commissioner (OHCHR) (2015-2016) (see (AU, 2015b; OHCHR, 2015)

Sources: Included in the Table; National Documents: Mining Laws- Local Content policies, Labour Laws and Social and Labour Plans for mining

Annex 4.6: Regional SD Goals

Regional SD goals tabled through a lengthy scan of the challenges and issues facing the continent identified by the ECA and as Africa's contribution to the post-2015 development framework were co-opted into the SD indicators' framework. These became the goals for which the indicators were aimed at achieving in the long-term. The Global SDGs were not used because the regional SD Goals reflect the regional but global view of what continent wants to achieve in SD. The goals presented below are adapted from (ECA, 2013a, 2013b, 2013c, 2013d, 2013e).

Proposed Sustainable Development Goals for the African Region	
Goal 1	Eradicate poverty and extreme hunger, and achieve food and nutrition security
Goal 2	Vigorously promote good governance, peace and security
Goal 3	Provide adequate, qualitative, affordable and accessible health care to all
Goal 4	Enhance accessibility and affordability of quality education to all
Goal 5	Improve availability and accessibility of clean water and sanitation to all
Goal 6	Intensify gender equality, women empowerment and youth development
Goal 7	Heighten social inclusion and security for all
Goal 8	Transform conventional to inclusive green growth and promote sustainable consumption and production
Goal 9	Scale-up investments in infrastructure development and efficient services
Goal 10	Advance sustainable exploitation, use and management of natural resources
Goal 11	Improve quality and sustainability of the environment
Goal 12	Promote global partnerships and institutional effectiveness

Source: (ECA, 2013e)

Annex 4.7: Scores for the four Countries under the Social System

The following indicators were assessed: S1- governance, S2- quality of life, S3- gender equality and empowerment, S4- human rights concerns, S5- legal provisions for CSR, S6- local content legislation provisions, S7- social cohesion and socio-economic development, and S8- compliance on global and regional voluntary initiatives. The scores are presented below.

S1: Governance

The measure for this indicator was the Worldwide Governance Indicators. See scores.

Worldwide Governance Indicators (WGI)			
Country	**Series Name**	**2015**	**Final Scores for S1 (Avg. of the series)**
Ghana	Control of Corruption: Percentile Rank	53.4	
	Government Effectiveness: Percentile Rank	44.7	
	Political Stability and Absence of Violence/Terrorism: Percentile Rank	50.0	
	Regulatory Quality: Percentile Rank	53.4	
	Rule of Law: Percentile Rank	60.6	
	Voice and Accountability: Percentile Rank	65.5	**55%**
Dem. Rep. Congo (DRC)	Control of Corruption: Percentile Rank	9.1	
	Government Effectiveness: Percentile Rank	3.8	
	Political Stability and Absence of Violence/Terrorism: Percentile Rank	3.8	
	Regulatory Quality: Percentile Rank	6.3	
	Rule of Law: Percentile Rank	3.4	
	Voice and Accountability: Percentile Rank	12.8	**7%**
Tanzania	Control of Corruption: Percentile Rank	25.5	
	Government Effectiveness: Percentile Rank	31.3	
	Political Stability and Absence of Violence/Terrorism: Percentile Rank	30.5	
	Regulatory Quality: Percentile Rank	41.3	
	Rule of Law: Percentile Rank	39.4	
	Voice and Accountability: Percentile Rank	40.4	**35%**
South Africa	Control of Corruption: Percentile Rank	58.2	
	Government Effectiveness: Percentile Rank	64.9	
	Political Stability and Absence of Violence/Terrorism: Percentile Rank	38.6	
	Regulatory Quality: Percentile Rank	63.9	
	Rule of Law: Percentile Rank	59.1	
	Voice and Accountability: Percentile Rank	68.5	**59%**

Source: World Bank- WGI (2015)

S2: Quality of Life

The measure for this indicator were the HDI and the Global Peace Index. See scores.

S 2: Quality of Life			
Countries	**Human Development Index- HDI (0 - 1) 2015**	**Scaling**	**Use in the SDI (scaled to 100)**
Ghana	0.579	57.9	57.9
SA	0.666	66.6	66.6
Tanzania	0.521	52.1	52.1
DRC	0.433	43.3	43.3
Countries	**Global Peace Index- GPI (1- 5) 2015= x**	**Scaling y= (x/5)**	**Use in the SDI (scaled to 100) (100- y)**
Ghana	1.84	0.368	63.2
SA	2.376	0.4752	52.48
Tanzania	1.903	0.3806	61.94
DRC	2.196	0.4392	56.08
Final Scores for S2- Quality of Life			
Countries	**HDI**	**GPI**	**Final Scores for S2 (Avg. of HDI and GPI)**
Ghana	57.9	63.2	**61%**
SA	66.6	52.48	**60%**
Tanzania	52.1	61.94	**57%**
DRC	43.3	56.08	**50%**

Sources: UNDP (2016); Institute for Economics and Peace (2015)

S3: Gender Equality and Empowerment

The measure for this indicator was the Gender Inequality Index. See scores below.

S 3: Gender Equality and Empowerment			
Countries	**Gender Inequality Index (0-1) 2015= x**	**Scaling (1-x)**	**Use in the SDI (scaled to 100)**
			Final Scores for S3
Ghana	0.547	0.453	**45%**
DRC	0.663	0.337	**34%**
South Africa	0.394	0.606	**61%**
Tanzania	0.544	0.456	**46%**

Source: UNDP (2015)

S4: Human Rights Concerns

The measure for this indicator were civil and political liberties of the Freedom House Indicators. See scores.

S 4: Human Rights Concerns							
Countries	**Freedom House Indicators (2015)**		**Freedom Rating (1/7)**				**Use in the SDI (scaled to 100)**
	Civil Liberties	**Political Rights**	**X**		**(x/7)**	**1-x**	**Final scores for S4**
Ghana	2	1	1.5		0.21	0.79	**79%**
Dem. R. Congo	6	6	6		0.86	0.14	**14%**
South Africa	2	2	2		0.29	0.71	**71%**
Tanzania	3	3	3		0.43	0.57	**57%**

Source: Freedom House (2015)

S5 (CSR Provisions) and S6 (Local Content Requirements)

S5.1 CSR Strategies and S6.1 Local Content Strategies

S 5.1 and S 6.1 assessed the existence of express LC and CSR regulations or strategies. It was ranked based on (100% - yes, 75% - to greater extent, 50% - average consideration, 25% - to a lesser extent, 0% - no consideration).

S 5.1- CSR Provisions and S 6.1- Local Content Requirements		
Countries	**S 6.1: Are there legal provisions for local content in mining codes?**	**S 5.1: Are there legal provisions for CSR in mining codes?**
Ghana	**100%**	**50%**
Dem. R. Congo	**25%**	**25%**
South Africa	**100%**	**50%**
Tanzania	**100%**	**25%**

Sources: National mining documents- DRC (DRC, 2002a, 2003, 2006); Ghana (GoG, 2003, 2006, 2012e); South Africa (Republic of South Africa, 1995, 2002; Republic of South Africa-Department of Labour, 2013; Republic of South Africa-DMR, 2004, 2004); Tanzania (The United Republic of Tanzania, 2004a, 2010)

S5.2 CSR Provisions and S6.2 Local Content Provisions

S 5.2 and S 6.2 teased key CSR and LC elements for social sustainability. These are presented in the tables below. The legislative instruments whether implied or expressed are ranked based on the elements below. (1 for yes, 0.5 for implied and 0 for not included in the regime's requirements).

S 5.2: Legal provisions for CSR												
Countries	Economic Issues	Beyond environmental sustainability			Social upliftment				Employee issues				
	community and socio-economic development	Reclamation	Re-afforestation	Promotion of Cleaner Technologies	Education	Health	Sports and Youth Development	Cultural Enhancement	HRD- CPD	Provisions for Collective Bargaining	Company and employee Relationships	Job Security	Percentage of total
South Africa	1	1	1	1	1	1	1	1	1	1	1	1	100
Dem. R. Congo	1	1	1	1	1	1	0	0	1	1	1	0	75
Ghana	1	1	1	1	1	1	0	0	1	1	1	0	75
Tanzania	1	1	1	0	1	1	0	0	1	1	1	0	67

Sources: National mining documents- DRC (DRC, 2002a, 2003, 2006); Ghana (GoG, 2003, 2006, 2012e); South Africa (Republic of South Africa, 1995, 2002; Republic of South Africa-Department of Labour, 2013; Republic of South Africa-DMR, 2004, 2004); Tanzania (The United Republic of Tanzania, 2004a, 2010)

S 6.2: Local Content Policies and Mining Law												
Local Content Provisions												
Countries	Building Local Infrastructure	community development	Employment- Job Creation	Community Development Fund	Community Involvement and relationships	Local procurement & Enterprise Development	Technology transfers	Research and development	Training and skills development	Local content plan	Monitoring and evaluation	Percentage of total
South Africa	1	1	1	1	1	1	1	1	1	1	1	100

Dem. R. Congo	1	1	1	0	1	0	0	0	0	0	0	36.4
Ghana	0	1	1	1	1	1	0	1	1	0	1	73
Tanzania	0	1	1	0	1	1	0	0	1	1	0	55

Sources: National mining documents- DRC (DRC, 2002a, 2003, 2006); Ghana (GoG, 2003, 2006, 2012e); South Africa (Republic of South Africa, 1995, 2002; Republic of South Africa-Department of Labour, 2013; Republic of South Africa-DMR, 2004, 2004); Tanzania (The United Republic of Tanzania, 2004a, 2010)

The total scores for S 5 and S 6 are presented in the table below.

	S5: Legal Provisions for CSR			S6: Local Content Legislation		
Countries	Are there legal provisions for CSR in mining codes?	What elements are considered?	**Final Scores for S5**	Are there legal provisions for local content in mining codes?	What elements are considered?	**Final Scores for S6**
Ghana	50	75	**63%**	100	72.3	**87%**
DRC	25	75	**50%**	25	36	**31%**
South Africa	50	100	**75%**	100	100	**100%**
Tanzania	25	67	**46%**	100	55	**78%**

Source: Author's Calculations (2016)

S7: Social Cohesion and Socio-economic Development

The measure for this indicator were CPIAs Social Cohesion policy assessment and the African Infrastructure Development Index. See scores below.

S7: Social Cohesion and Socio-economic Development				
Countries	**CPIA- Social cohesion (2015)**		**Africa Infrastructure Development Index (2015)**	**Final Scores for S7**
	Scored out of 6	Use in the SDI (Normalised scores)	scored out of 100	
Ghana	3.95	65.83	25.43	**46%**
DRC	2.75	45.83	8.089	**27%**
South Africa	3.35	55.83	75.9	**66%**
Tanzania	3.85	64.17	11.92	**38%**

Source: World Bank (2015); AfDB (2016)

S8: Compliance on Global and Regional Vol. Initiatives

The status and ratification on the listed relevant global and regional social instruments for Mineral economies were ranked based on the following: (signed and ratified (1), not signed (0), signed but not ratified (0.5). The final scores are presented in the tables below S8.1- regional instruments and S8.2- global frameworks.

S 8.1: Status of Ratification on Regional Instruments (As of 2015)					
Countries	African Convention on the conservation of nature and natural resources	African Charter on Human and Peoples Rights	Revised African Convention on the Conservation of Nature and Natural Resources		Percentage of Total
Dem. Rep. Congo	1	1	0.5	0.833	**83%**
Ghana	1	1	1	1	**100%**
South Africa	1	1	1	1	**100%**
Tanzania	0.5	1	1	0.833	**83%**

Source: AU Regional Frameworks from the Repository (see AU, 2015)

S 8.2: Status of Ratification on Global Human Rights Instruments (As of 2015)																		
Countries	International Convention on the Elimination of All Forms of Racial Discrimination :1969	International Covenant on Civil and Political Rights: 1976	Optional Protocol to the International Covenant on Civil and Political Rights: 1976	Second Optional Protocol to the International Covenant on Civil and Political Rights, aiming at the abolition of the death penalty: 1991	International Covenant on Economic, Social and Cultural Rights: 1976	Optional Protocol to the International Covenant on Economic, Social and Cultural Rights: 2013	Convention on the Elimination of All Forms of Discrimination against Women: 1981	Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women: 2000	Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment: 1987	Optional Protocol to the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment: 2006	Convention on the Rights of the Child: 1990	Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict: 2002	Optional Protocol to the Convention on the Rights of the Child on the sale of children, child prostitution and child pornography: 2002	Optional Protocol to the Convention on the Rights of the Child on a communications procedure: 2014	International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families: 2003	International Convention for the Protection of all Persons from Enforced Disappearance: 2010	Convention on the Rights of Persons with Disabilities: 2008	Optional Protocol to the Convention on the Rights of Persons with Disabilities: 2008	Percentage of Total
Ghana	1	1	1	0	1	0.5	1	1	1	0.5	1	1	0.5	0.5	1	0.5	1	1	**81%**
DRC	1	1	1	0	1	0.5	1	0	1	1	1	1	1	0	0	0	1	1	**69%**
South Africa	1	1	1	1	1	0	1	1	1	0.5	1	1	1	0	0	0	1	1	**75%**
Tanzania	1	1	0	0	1	0	1	1	0	0	1	1	1	0	0	0.5	1	1	**58%**

Source: OHCHR Framework Repository on Status of Ratification of UN Frameworks (see AU, 2015; OHCHR, 2015)

The total scores for S 8 are presented in the table below.

S8: Compliance on Global and Regional Vol. Initiatives			
Countries	**Global Human Rights Frameworks**	**Regional Frameworks- Social and Human Rights**	**Final Scores for S8**
Ghana	80.6	100	**90%**
Dem. R. Congo	69.4	83.3	**76%**
South Africa	75.0	100	**88%**
Tanzania	58.3	83.3	**71%**

Source: Author's Calculations (2016)

Annex 4.8: Scores for the four Countries under the Natural System

Environmental system covered seven core indicators of relevance to mineral economies. These are: N 1: Environmental Regulations; N 2: Environmental Quality; N 3: Sustainable Natural Resource Management (NRM); N 4: Mine Closure; N 5: ASM Environmental Issues; N 6: Knowledge of Mineral Reserves and Resources; and N 7: Compliance on Global and Regional SD Frameworks. The scores are presented below:

N1: Effective Environmental Regulations

For N1, the existence of the following (issues) regulated in the environmental regime was scored on toggle question of (0, No and 1, Yes) based on provisions of the mining regime and jurisdictions requirements.

N1: Effective Environmental Regulations							
Countries	Cumulative national air emissions	Water	Land degradation (pollution)	Nuisance	Climate change	Biodiversity protection	**Final scores for N1**
Ghana	1	1	1	1	1	1	**100%**
Dem. R. Congo	1	1	1	1	1	1	**100%**
South Africa	1	1	1	1	1	1	**100%**
Tanzania	1	1	1	1	1	1	**100%**

Sources: National mining documents- DRC (DRC, 2002a, 2003, 2011); Ghana (GoG, 1994, 1999, 2006); South Africa (Republic of South Africa, 1998, 2002; Republic of South Africa-DME, 2011) Tanzania (The United Republic of Tanzania, 2004b, 2010)

N2: Environmental Quality

The measure for this indicator was the Environmental Performance Index. See scores.

N2: Environmental Quality (EPI, 2014)	
Environmental Performance Index (EPI)*, Scoring (0-100)	**Final Scores for N2**
Ghana	**32%**
Dem. R. Congo	**25%**
South Africa	**54%**
Tanzania	**36%**

Source: Yale Center for Environmental Law & Policy- YCELP, 2014)

*Scoring for N2 on the EPI is out of 100 and is maintained for the SDI calculations.

N3: Natural Resource Management

The strategies and provisions of the environmental regimes for NRM were ranked on a scale of (100%- yes, 75%- to greater extent, 50%- average consideration, 25%- to a lesser extent, 0%- no). The average scores for the probing questions are included in the table below.

N3: Natural Resource Management							
Countries	1. Are there any sustainable land and water management strategies in place or NRM systems?	2. Are there legal provisions which support the integration of NRM in all development policies?	3. Are there M&E protocols to check non-compliance on NRM strategies?	4. Have there been national benchmarks/ and targets which have been set for mining?	5. Are environmental mgmt. fund for rehabilitation of mining site and communities in the mineral regime?	6. Are there NRM strategies and initiatives by governments to check non-compliance?	**Final Scores for N3**
Ghana	75	50	25	25	100	50	**54%**
Dem. R. Congo	50	50	25	25	25	25	**33%**
South Africa	75	100	75	75	100	50	**79%**
Tanzania	75	75	50	25	100	50	**63%**

Sources: National mining documents- DRC (DRC, 2002a, 2003, 2011); Ghana (GoG, 1994, 1999, 2006); South Africa (Republic of South Africa, 1998, 2002; Republic of South Africa-DME, 2011) Tanzania (The United Republic of Tanzania, 2004b, 2010)

N4: Mine Closure

The strategies and provisions of the environmental regimes for post-mine closure were ranked on a scale of (100%- yes, 75%- to greater extent, 50%- average consideration, 25%- to a lesser extent, 0%- no). The average scores for the probing questions are included in the table below.

N4: Mine Closure							
Countries	1. Are legal requirements for post-mine closure adequately outlined in the mineral regime?	2. Are there plans and strategies for post mine closure enforced in the mining regulation?	3. In terms of strategies and plans for post-mine closure, are they reviewed frequently?	4. Are there monitoring mechanisms for post-mine closure in place?	5. Do the national and local authorities include the scenario of closure in their development	6. Are provisions being made from the benefits of mining to support development initiatives for mine closure at the local level?	**Final Scores for N4**
Ghana	75	100	25	25	0	25	**42%**

Dem. R. Congo	50	50	25	25	0	0	**25%**
South Africa	75	100	100	75	50	50	**75%**
Tanzania	75	100	50	25	0	25	**46%**

Sources: National mining documents- DRC (DRC, 2002a, 2003, 2011); Ghana (GoG, 1994, 1999, 2006); South Africa (Republic of South Africa, 1998, 2002; Republic of South Africa-DME, 2011) Tanzania (The United Republic of Tanzania, 2004b, 2010)

N5: ASM (Environmental) Issues

The strategies and provisions of the environmental regimes for ASM regulation were ranked on a scale of (100%- yes, 75%- to greater extent, 50%- average consideration, 25%- to a lesser extent, 0%- no). The average scores for the probing questions are included in the table below.

N5: ASM (Environmental) Issues							
Countries	1. Are there legal provisions which support the integration of ASM activities in all development policies?	2. Are there legal provisions regulating the environmental impact of ASM activities?	3. Have there been national benchmarks/ and targets which have been set for regulating ASM activities?	4. Are environmental mgmt. plans/ fund required for operation by ASM operators on mining site and communities in the mineral	5. Are there NRM strategies and initiatives by government to check the impact ASM activities on the environment?	6. Are there M&E protocols to check non-compliance on NRM strategies for ASM?	**Final Scores for N5**
Ghana	50	25	0	100	25	0	**33%**
Dem. R. Congo	50	25	0	50	0	0	**21%**
South Africa	75	25	0	100	25	25	**42%**
Tanzania	75	25	0	100	25	0	**38%**

Sources: National mining documents- DRC (DRC, 2002a, 2003, 2011); Ghana (GoG, 1994, 1999, 2006); South Africa (Republic of South Africa, 1998, 2002; Republic of South Africa-DME, 2011) Tanzania (The United Republic of Tanzania, 2004b, 2010)

N6: Knowledge of Resources and Reserves

Knowledge of the existence of resources and reserves were ranked on a scale of (100%- yes, 75%- to greater extent, 50%- average consideration, 25%- to a lesser extent, 0%- no). The average scores for the probing questions are included in the table below.

N6: Knowledge of Resources and Reserves							
Countries	1. Is there knowledge of all known mineral resources and reserves?	2. Have all minerals and the extent of the resources and reserves been mapped out?	3. Is there knowledge of probable gold ore reserves in the regime?	4. Is there knowledge of proven gold ore reserves in the regime?	5. Are there long-term plans ensuring the sustainability of the reserves for future generations?	6. Do you have a mineral revenue management regulation to deal with revenues from gold?	**Final Scores for N6**
Ghana	75	75	50	25	0	0	**38%**
Dem. R. Congo	75	25	25	0	0	0	**21%**
South Africa	100	100	100	100	0	0	**67%**
Tanzania	75	75	75	25	0	0	**42%**

Sources: DRC (Chamber of Mines- DRC, 2015); South Africa (Chamber of Mines- SA, 2015; StatsSA, 2013); Ghana (The Ghana Chamber of Mines, 2014); Tanzania (The United Republic of Tanzania, 2015b, 2008); USGS (2015, 2012)

*For this indicator, inference was made from available survey documents, from the USGS and national information available online. The most accurate of the data was from South Africa's mineral accounts spanning 1990- 2010.

N7: Compliance on Global and Regional Environmental Frameworks

The status and ratification on the listed relevant global and regional environmental instruments for Mineral economies were ranked based on the following: (signed and ratified (1), not signed (0), signed but not ratified (0.5). The final scores are presented in the table.

Status on Global SD Instruments and Frameworks of Relevance to Mineral economies																		
Countries	The Convention on Biological Diversity	The United Nations Convention to Combat Desertification	The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal	Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movements of Hazardous Wastes Within Africa	The United Nations Framework Convention on Climate Change (UNFCCC)	The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	The Kyoto Protocol to United Nations Framework on Climate Change	The Vienna Convention for the Protection of the Ozone Layer	The Montreal Protocol on Substances that deplete the Ozone Layer	The Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora	The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	The Stockholm Convention on Persistent Organic Pollutants (POPs)	The Cartagena Protocol on Biosafety	Cancun Adaptation Framework	Minamata Convention*	SDGs*	Paris Agreement*	**Final Scores for N7**
Ghana	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	**91%**
Dem. R. Congo	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	**91%**
South Africa	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	**91%**
Tanzania	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	**91%**

Source: Source: OHCHR Framework Repository on Status of Ratification of UN Frameworks (see AU, 2015; OHCHR, 2015)

*****The environmental considerations in the SDGs were ranked. Since, all the four countries were signatories to the passing of the SDGs together with the COP 15 for the Paris declaration, they each received (0.5) in the SD assessment. In this light, the Minamata Conventions, which was also recently passed have been signed by all four countries and are yet to ratify, the terms of the agreement in their legislations, hence on this instrument, they each received (0.5)

Annex 4.9: Scores for the four Countries under the Economic System

Under the economic system, eight core indicators were assessed. The indicators included: E1- macroeconomic stability; E2- investments into capital development; E3- resource nationalism issues; E4- mining sector linkages; E5- transparency and management of public revenues; E6- artisanal and small-scale mining (economic) issues; E7- sustainable production; and E8: trade and investment. The scores are provided below.

E 1: Macroeconomic Stability

The measure for this indicator was the WEFs macroeconomic stability pillar and the CPIA's macroeconomic environment scores. See scores.

E 1: Macroeconomic Stability			
World Economic Forum (2015)			
Macroeconomic Stability Pillar (out of 7) = x		(x/7)	Rescaled (to 100)
Ghana	2.792	0.398	40%
Tanzania	4.532	0.674	65%
Dem. R. Congo	3.25 (out of 6) *	0.542 (out of 6) *	54%*
South Africa	4.502	0.643	64%

Source: WEF (2015)

*The Democratic Republic of Congo was not part of the WEFs 2015 assessment of Global Competitiveness, thus on macroeconomic stability, the SD assessment relayed upon the World Bank's CPIA on the following: business regulatory environment rating, debt policy rating economic management cluster, efficiency of revenue mobilisation rating average, fiscal policy rating, macroeconomic management rating, quality of budgetary, financial management rating, and structural policies cluster average for macroeconomic stability. On this parameter, the DRC scored an average of 3.25 from the 2015 dataset.

E 2: Investment into Capital Development

The measure for this indicator were Gross Fixed Capital Formation, and the WEFs Innovation pillar. See scores below.

E2: Investments into Capital Development							
Countries	Gross Fixed Capital Formation (%) of GDP	Score (min max transformation)		WEFs Innovation Pillar (1/7)= x	Score (x/7)	Average (GCFC and WEF Innovation Pillar)	Final Scores for E2 (Scaled to 100)
Ghana	23.61	0.33		3.31	0.47	**0.4**	40%
Dem. R. Congo	16.15	0.17		2.77	0.40	**0.285**	29%
South Africa	20.05	0.26		3.69	0.53	**0.395**	39%
Tanzania	31.26	0.50		3.03	0.43	**0.465**	47%

Source: World Bank (2015); WEF (2015)

E 3: Resource Nationalism Issues

The measure for this indicator was the policy perception index (2015). See scores below.

E 3: Resource Nationalism Issues		
Countries	**Policy Perception Index**	**Final Scores for E3**
Ghana	69.089	**69%**
Dem. R. Congo	42.743	**43%**
South Africa	51.913	**52%**
Tanzania	62.124	**62%**

Source: Jackson and Green (2015)

E 4: Mineral Sector Linkages (Beneficiation and Procurement)

E4.1: Local Beneficiation Strategies

E 4.1 assessed the existence of express local beneficiation strategies. It was ranked based on (100%- yes, 75%- to greater extent, 50%- average consideration, 25%- to a lesser extent, 0%- no).

E4.1: Local Beneficiation Strategies					
Countries	4. Are there monitoring mechanisms for local beneficiation in place?	3. In terms of strategies and plans for local beneficiation, are they reviewed frequently?	2. Are there plans and strategies for local beneficiation?	1. Are legal requirements for local beneficiation adequately outlined?	**Score (%)**
Ghana	0	0	25	25	**12.5**
Dem. R. Congo	0	0	25	25	**12.5**
South Africa	75	50	75	75	**68.75**
Tanzania	0	0	25	25	**12.5**

Sources: National mining documents- DRC (DRC, 2002a, 2003); Ghana (GoG, 2006, 2010, 2012b); South Africa (Republic of South Africa, 2002, 2011; Republic of South Africa-DMR, 2010); Tanzania (The United Republic of Tanzania, 2010, 2011)

E4.2: Local Procurement and Supply Chain Strategies

E 4.2 assessed the existence of express local procurement and supply chain strategies for mining. It was ranked based on (100- yes, 75- to greater extent, 50- average consideration, 25- to a lesser extent, 0- no).

E4.2: Local Procurement and Supply Chain Strategies					
Countries	4. Do local authorities in mining communities include plans and strategies to enhance local procurement and supply chain requirement in their development planning?	3. Are there monitoring mechanisms for local procurement and supply chain in place, such as benchmarks, targets and incentives for local procurement and supply chain?	2. Are there plans and strategies for local procurement and supply chain enforced in the mining regulation?	1. Are legal requirements for local procurement and supply chain adequately outlined in the mineral regime?	**Score (%)**
Ghana	50	25	50	75	**50**
Dem. R. Congo	25	25	50	75	**43.75**
South Africa	100	100	100	100	**100**
Tanzania	50	25	50	75	**50**

Sources: National mining documents- DRC (DRC, 2002a, 2003); Ghana (GoG, 2006, 2010, 2012b); South Africa (Republic of South Africa, 2002, 2011; Republic of South Africa-DMR, 2010); Tanzania (The United Republic of Tanzania, 2010, 2011)

The total scores for E 4 are presented in the table below.

E 4: Mineral Sector Linkages			
Countries	**E 4.2**	**E 4.1**	**Final Scores for E4**
Ghana	50%	12.5%	**31%**
Dem. R. Congo	43.75%	12.5%	**28%**
South Africa	100%	68.75%	**84%**
Tanzania	50%	12.5%	**31%**

Source: Author's Calculations (2016)

E 5: Transparency and Management of Public Revenues

The measure for this indicator was the institutions and enabling environment for transparency in mineral revenues of the Resource Governance Index. See scores.

E 5: Transparency and Management of Public Revenues		
Resource Governance Index* (Institutions and Enabling Environment)		**Final Scores for E 5**
South Africa	55.5	**56%**

Ghana	62.7	63%
Tanzania	49.76	50%
Dem. R. Congo	38.6	39%

Source: Revenue Watch (2013)

***** The indicator used the enabling environment for transparency and quality of the institutions to ensure effective management of mineral revenues. The Resource Governance Index was used as the proxy to measure E4.

E 6: ASM (Economic) Issues

The strategies and provisions of the regime for enhancing the economic development of ASM were ranked on a scale of (100%- yes, 75%- to greater extent, 50%- average consideration, 25%- to a lesser extent, 0%- no). The average scores for the probing questions are included below:

E 6: ASM (Economic) Issues					
Countries	4. Are there M&E protocols to check non-compliance ASM Operators in the mineral regime?	3. Have there been medium to long term funds set up for enhancing the economic opportunities of ASM activities and their communities in the mineral regime?	2. Are there legal provisions enhancing the economic impact of ASM through skills development, training and optimising ASM as a business in the mineral regime?	1. Are there provisions which legalise all types of artisanal, small and medium scale mining activities in the mineral regime?	**Final scores for E6**
Ghana	25	25	50	50	38%
Dem. R. Congo	25	25	50	50	38%
South Africa	50	50	75	50	56%
Tanzania	25	25	75	75	50%

Sources: National mining documents- Ghana (DRC, 2002a, 2003, GoG, 2006, 2010, 2012b, Republic of South Africa, 2002, 2011; Republic of South Africa-DMR, 2010; The United Republic of Tanzania, 2010, 2011)

E 7: Sustainable Production

The measure for this indicator was the *net adjusted savings* of the World Bank. See scores

E 7: Sustainable Production			
Countries	**Net Adjusted Savings (%) Change, World Bank stats**	**Min-max Transformation**	**Final scores for E7 (scaled to 100)**
Ghana	1.606857991	0.460102639	**46%**
Dem. R. Congo	-26.64056333	0	**0%**
South Africa	2.127863939	0.468588943	**47%**
Tanzania	15.14949106	0.680689189	**68%**

Source: World Bank (2015)

E 8: Trade and Investment

The measure for this indicator were the ECA's Regional Trade Integration Index (E.8.1), the CPIA's Trade Policy Openness (E.8.2), trade intensity (E 8.3), and the existence of an investment fund (E.8.4), specifically from mineral resources in the country. E 8.4, was scored on a toggle question of (0, No and 1, Yes) based on provisions of the mining regime and jurisdictions' requirements.

E 8: Trade and Investment								
Countries	E 8.1: Trade integration (ECAs RITI)	E 8.2: trade intensity (merchandise trade (%) to GDP)	(1- 0 min max scaling) of E 8.2	E 8.3: Trade policy openness (CPIA) (Out of 6)	Re-scaled to (100) for Trade policy openness (CPIA)	E 8.4: Existence of Investment Fund for Mining Revenues	Avg. of (E8.1-E8.4)	**Final Scores for E 8 (scaled to 100).**
Ghana	**0.604**	60.33	**0.355**	4	**0.67**	**0**	**0.407**	**41%**
Dem. R. Congo	**0.275**	34.05	**0.1547**	3.5	**0.58**	**0**	**0.247**	**25%**
South Africa*	**1**	59.56	**0.3491**	4	**0.67**	**0**	**0.504**	**50%**
Tanzania	**0.78**	33.88	**0.1534**	4	**0.67**	**0**	**0.40**	**40%**

Several Sources: ECA (2016); World Bank (2015); National documents- DRC (DRC, 2002a); Ghana (GoG, 2006); South Africa (Republic of South Africa, 2002); Tanzania (The United Republic of Tanzania, 2010)

*Because there are no CPIA values for South Africa, the sub-regional average of (4) was determined from the scores of countries within Southern Africa for South Africa.

Annex 4.10: Mining Charter Report Card for Gold Mining Companies

The Table highlights the performance of the four major gold mining companies in South Africa with market capitalisation of above (R200 billion in assets) and their compliance on the benchmarks and targets set in the Charter as signatories to the "Stakeholder Declaration Strategy" on the Charter.

Report Card on SAs Mining Charter- Gold Mining Companies*

Theme	Targets	AGA	Gold Fields	Harmony	Sibanye
Reporting	Annual Reporting	Annually fulfilled	Annually fulfilled	Annually fulfilled	Annually fulfilled
Ownership	26% of equity to HDSA	Target reached	Target reached	Target reached	Target reached
Housing and living conditions	Single Occupancy	Target reached	Target reached	97.78	Target reached
	Family Units	Target reached	Target reached	Not reached/ in Discussions (DMR)	Not reached/ in Discussions (DMR)
Procurement	Capital goods (40%)	53	81.86	82.56	54.44
	Services (70%)	73	73.07	73.89	71.36
	Consumer goods (50%)	67	85.03	67.56	65.67
	Annual spend of (0.5%) supply chain from multinationals		0.23	0% from multi-national suppliers	Source from local companies
Employment (40%)	Top Management	55.6	50	60	38.46
	Senior Management	42.9	50	46.49	34.79
	Middle Management	49.3	63.16	38.58	26.14
	Junior Management	57.4	52.31	56	43.43
	Core Skills (40%)	52.6	72	62.57	64.71
HRD	5% of total payroll	Not reached/ in Discussions	96	86.44	47.83
SD and growth of the mining industry	Implementing EMP (100%)	Not reached/ in Discussions	100	87.5	100
	Implementing Health & Safety (100%)	95	100	100	95.8
	% of Sampling to SA Facilities (100%)	100	100	100	100
Mine Community Development	Working with Local Municipalities/ IDP	Almost reached/ in Discussions (DMR)	96	86.44	47.83

Sources: Data from DMR in "this is gold," (2015a, 2015b) fact sheet

* The major players include (AngloGold Ashanti Ltd., Gold Fields Ltd., Harmony Gold Ltd., and Sibanye Gold Ltd.).

Chapter 6

Annex 6.1: Core Sustainable Development Principles by UNCTAD

These principles by UNCTAD (2012) shown in the Table are to provide guidelines for parties for green investments and assisting countries in designing robust investment policies.

Core Principles	Definitions
1. Investment for sustainable development	• Concerns for environmental and social issues in investment policy decision making.
2. Policy coherence	• Ensure that investment policies are integral in a country's overall development vision and plan, and in harmony with international level instruments and frameworks.
3. Public governance and institutions	• Strong regulatory framework and rule of law should persist in administering investment policies with transparency and accountability present in all procedures and dealings between investor and host nations.
4. Dynamic policymaking	• Investment policies should be evolving to suit any development dynamics that may persist in the future.
5. Balanced rights and obligations	• The right and obligations of the host State and investor should be clearly defined and balanced for all.
6. States' right to regulate	• A State should have the right to set entry and operational requirements to guide foreign investment and in the interest of its citizens.
7. Openness to investment	• Investment policies should be structured in such a way that it is open and stable with minimal political and economic risks borne by the investor.
8. Investment protection	• Investment policies must provide the enabling environment for foreign investments to thrive and with adequate protections established.
9. Investment promotion and facilitation	• Investment policies should be aligned to the SDGs whereas promoting direct investments into a country.
10. Corporate governance and responsibility	• Investment policies must enhance CSR objectives and comply with global best practices on social responsibility and corporate governance.
11. International cooperation	• There should be international corporation that addresses the challenges of investment policies and development.

Source: Adapted from UNCTAD (2012; p.11)

Chapter 8

Annex 8.1: Top Gold Producing Countries used for the Global CIF Averages

FISCAL REQUIREMENTS OF THE CIF (SEE CHAPTER SIX)	TOP TEN GOLD PRODUCING COUNTRIES										
	China	Russia	Australia	United States (Various States)	Canada (Quebec, British Columbia and Ontario)	Peru	South Africa	Mexico	Uzbekistan	Ghana	Global CIF AVERAGE for gold economies (2016)
Tax stability agreements	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes*	Yes	Yes
Corporate tax rate (national)	25%	20%	30%	(4- 9%), 35%	10%- 16%	30%	(0%-32.5%) Acc. to a spec. formula for gold mining	30%	7.5%	35%	22.05%
Branch office tax	25%	20%	30%	5%, 30%-35%	5%, 25%	30%	28%	30%	10%	25%	25.55%
Income tax credits for foreigners	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimum corporate tax	x	15.50%	x	(4- 9%), 15%	10%	x	x	x	x	x	x
Additional profits tax	No (but a Resource tax exists separate from royalties)	Yes	No (was repealed)	No	No	Yes/ Special Mining Tax (SMT):	No	No	No (but there exists a special regime for after profit tax)	10%	No

Tax holidays (years)	Yes	No	No	(Yes/No) depends on State	Yes (3 years)	Yes (pre-production)	Yes/No	Yes	Yes (deducting expenses incurred for 5 years when there are expansions)	Yes (during pre-production)	Yes
Tax treaties	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ring fencing	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Forward carry of losses (years)	Yes (5 years)	Yes (10 years)	indefinitely after it has been assessed	Yes (20 years)	Yes (20 years)	Yes (4 years)	indefinitely after it has been assessed	Yes (10 years)	Yes (5 years)	Yes (5 years)	Yes (12.9 years)
Backward carry of losses	No	No	No	No	Yes (3 years)	No	No	No	No	No	No
Depreciation (years)	Minimum depreciation periods subject to the tax laws	(1- 25) over the life of the mine	Up to 100% on certain mining assets and outgoings	up to 50% on mining assets (over the life of the asset) (also depends on the State)	up to 50% on mining assets (over the life of the asset)	up to 50% on mining assets (over the life of the asset)	Up to 50% on mining assets (1-25) over the life of the mine	up to 50% on mining assets over the life of the mine	Up to 15% on mining assets over the life of the mine	20% over the life of the mine	41.87% (LOM)/ Method SL
Capital gains tax	No	Yes (30%)	Yes (30%)	Yes/No (depends on State)	Yes/No (depends on State)	5%	22.4%	Yes (25%-30%)	No	15%	Yes (21.65%)
Tax on assets	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Value added/sales tax	0%- 17%	18%	10%	depends on State	5%- 10%	16%	14%	0%	20%	14% generally (Mining exempt)	Yes (11.44%)
Fuel tax	Yes	Yes/No	Yes	Yes	Yes	Yes	Yes/No	Yes	Yes	Yes/No	Yes
Repatriation/dividend/with holding tax	10%	15%	10%	(Yes/No) (depends on State)	25% on dividends	5%	10%- 15% on dividends	10%	10%	8%- 10%	Yes (11.8%)

Import duties	0%	0%	0% (on mining machinery not produced in Australia)	0%	0%	0%	0%	5%	0%	Exempt for mining plant, machinery and equipment (all other materials for mining attract 5%)	0%
Export duties	Yes	Yes (depends on the tax act)	No	(Yes/No) (depends on State)	No	Mining exempt	Mining exempt	0%	0%	Mining exempt	0%
Payroll tax	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Land tax	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Provincial (State) taxes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Municipal taxes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes
Royalty rate	0.5%- 4%	6%	(3%- 5%)	0%, (2%-5%)	2- 16% (Range for the three provinces)	1%- 12%	(0.5- 5%) for refined/ (0.5- 7%) for unrefined	0.50%	2.8%- 5%	5%	4.39%
Transfer pricing rules	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Multiple Sources: Multiple Sources: PwC (2012); Ernest and Young (2015); Moody's Rating (2015a, 2015b, 2017); Mining Acts of DRC, Ghana, South Africa and Tanzania - (DRC, 2002a; GoG, 2006; Republic of South Africa, 2002; The United Republic of Tanzania, 2010)

Annex 8.2: Ghana's Evaluation for the IFRAD Strategy

Annex 8.2a: SWOT Analysis of Ghana's Mineral Sector

Strengths	Opportunities
• Matured and well-developed gold deposits within the African region. • A stable economic and political regime with a clearly defined mining framework. • Sound environment, which promotes foreign investments. • A somewhat favourable risk to reward ratio in the mining sector.	• Investment incentives (in the form of special tax arrangements) for senior miners when investments exceed US $500 million. • Reformed mining sector which is building capacity of its skills base. • Improved efforts in community development and social licence to operate.
Weaknesses	**Threats**
• Prone to external shocks should global prices fall. • Cost of mining is high due to a semi-developed mining infrastructure. • High incidence of negative externalities from mining on the environment. • Weak linkages of the sector to other sectors of the economy. • CSR frameworks for mining needs standardisation.	• Threat of losing out on mining investments to other countries within the region. • There is a deficit in mining infrastructure, skills and labour. • Low gold prices and weak demand from China may threaten the buoyancy of the sector. • Weak mining R & D may hinder transformation of the sector and increase the cost of mining gold should prices decline.

Sources: GoG (2010); GoG- NSDF (2015a); The Ghana Chamber of Mines (2011, 2012, 2012, 2013, 2014, 2016)

Annex 8.2b: The Inter-linkages between Ghana's Development Frameworks and Investment Policies with the Mining Sector

Elements	Points of Strategic Assessment	Issues		Comments on the Evaluation	Final Evaluation
Process 1: Integrating development objectives with mining	**Points of Strategic Assessment:** What are the country's express development objectives as well as mining's (potential) objectives'? Have they been aligned and has mining been integrated into the national development and industrial policies and strategies of the country?	**Development Frameworks:**	**Long-term Development Framework:** **Ghana National Spatial Development Framework (NSDF) (2015- 2035)** The NSDF addresses Ghana's development challenges in the next 20 years and provide a clear vision and guideline for Ghana's long-term development. The NSDF (2015- 2035) is contoured on the SDGs and recognises and strategically positions the sector and other natural resources for transformation (see GoG- NSDF, 2015). It does recognise Ghana's mining sector and has argued for the needed mining infrastructure, enforcing regulations for ASM and environmental management. **Medium-term Development Framework: Post- 2000** The two medium term frameworks- the **Growth and Poverty Reduction Strategy Paper (GPRSP) I & II and the Ghana Shared Growth and Development Agenda (GSGDA) I & II** also aimed to build a legacy of the sector with interventions to support the sector. The assessment of the frameworks showed the centrality of mining to Ghana's development. This drive under the GPRSP II and GSGDA I led to the establishment of Ghana's third Mining Act and first mining policy (in 2006 and 2011 respectively) in order to reshape the industry (see (GoG- GPRS II, 2006; GoG-GSGDA I, 2010). The mining policy was drafted to unify all the mineral development frameworks, industrial policies and environmental management policies toward the realization of SED ends.	Overall, Ghana has a clearly defined spatial development framework that recognises the impact of minerals of transformation and SED. Thus, for the evaluation, it was observed that its development, industrial, investment and mining frameworks are integrated.	**Yes**
		Mining Frameworks:	Minerals and Mining Act, 2006 (Act 703) The Act consolidated existing mining laws as a platform for transformation and sustainable development. The Act creates a special regime for mining and guides the mineral investment environment in Ghana. To define principles which fulfil the development imperatives for the country while developing the sector, a draft mining policy was devised in 2011. The principles clearly affirmed the need to achieve the socio-economic development of the economy and build the needed linkages within the sector. In 2012, new mining sector regulations (LI 2173- 2177; 2182) were unveiled to further some of the objectives defined in the mining policy and Ghana's medium-term development framework.		
		Industrial Frameworks:	**Ghana Industrial Policy (GIP) & the Industrial Support Sector Programme (ISSP)** Arguably, the GIP has been modern Ghana's first industrial policy which aims to create a modern productive economy, with high levels of value-addition and expand productive employment in the manufacturing sector. The GIP was unveiled in 2011 aimed at the competitiveness of its manufacturing sector and value addition for its productive sectors (GoG, 2011a; [b] 2011). Although, the mining sector was not specifically singled out for		

			improvement under the Industrial Sector Support Programme (ISSP), avenues for including the mining sector for value addition should have been considered. The challenge with the GIP was that although value addition was priority, the expert skills needed was strategized only for the oil and gas sector when it comes to mining.		
		Investment Frameworks:	There is the Ghana Investment Promotion Centre, which does not apply to mining generally since a special regime (the Minerals and Mining Act) applies. However, there are broader synergies in the supply chain services that fall under this investment framework. There are other public investment frameworks such as the Ghana infrastructure investment fund and the Ghana Public Investment Management Policy that are geared towards building public infrastructure.		
Process 2: Resource potential	**Points of Strategic Assessment:** Is there a national inventory that maps the economic potential of the mineral resource? Have governments set targets on acquiring information on the demonstrated mineral resources that are within its' jurisdiction, and are there on-going projects (government-led, private exploration (joint venture-ships with governments) and or regional-based, aimed at building the geological information of mineral ore bodies in the country?	**Institutions, programmes and projects by government and other partners**	Ghana's Geological Survey Department (GSD) undertakes all geological mapping of mineral resources in the country. It was established under Act 127 in 1962 to facilitate the geological mapping of Ghana. The economy has an inventory of its mineral resources and has on-going projects with a number of development partners such as the World Bank and the European Union. Ghana has partnered with the World Bank, the Nordic Development Fund, GEUS (Geological Survey of Denmark and Greenland) and others to acquire and secure adequate geological information on its mineral resources. It recently launched an online open cadastre system on minerals and mineral rights holders in the country. The Ghana Investment Promotion Centre (Act 865) stipulates the promotion of investments for exploration and exploitation. There are however not clearly defined targets on accumulating geological knowledge. The country recently passed the Geological Survey Authority Bill to advise the government on geoscientific issues, research and development on mineral resources and the environment. And the MDF has committed to providing funding for the GSD.	The evaluation was a 'yes' for Ghana. This is because the GSD undertakes geological mapping as its mandate.	**Yes**

Process 3: Type of mining investment	**Points of Strategic Assessment:** What types of mineral investments exist and is the investment regime competitive? How are current mining investments (development) agreements structured? What new (potential) and current risks have affected the regime and how has it affected mining investments?	**Types of mineral investments and is the regime competitive?**	Ghana has several BITs with other African countries and partners outside of Africa. ECA (2016) listed all the countries in Africa and outside the continent that Ghana has entered into an agreement with. The economy remains competitive and attractive to foreign investment with the GIPC Act 2013. As a mining destination, the opportunities of its mining sector lay in the incentives for competitiveness through stability agreements, MDAs and other benefits for mining capital (such as tax exemptions), no VAT on certain mining equipment, amongst others. To further support a liberalised agenda for development, it enacted the Technology Transfer Regulations, 1992, (LI 1547) and Transfer Pricing Regulations, 2012 (L.I. 2182) to safeguard R & D creation and to curb illicit transfer of funds by foreign companies.	Based on the CIF assessment and it investment environment, the evaluation for Ghana remains competitive to attract investments.	**Competitive**
Process 4: Mining sector linkages	**Points of Strategic Assessment:** Have effective safeguards been established in the legislative framework to support mining sector agencies? In terms of building critical mining sector linkages are the economy's local content and CSR policies well integrated with its fiscal policy? Has government been successful in managing various risk factors which influence mining investments?	**The focus is on LC and CSR and institutions that support mineral sector linkages and governance**	Ghana's mining regulations L. I. (2173- 2177; 2182) capture local content, recruitment and employment quotas, local procurement and penal actions for non-compliance. The regulations also cover health and safety, explosives, licensing and compensation and resettlement. There are institutions to monitor compliance. These include the Minerals Commission working in partnership with the Ghana Chamber of Mines. Thus, the evaluation for Process 4 show a 'yes' in all three aspects for optimal mining transmission. For the L.I.s which support the sector, the penal actions are fines for non-compliance. The monetary charges are put into a fund to train and build local capacity and development of the mining sector. Based on the evaluation of the regime, the elements and their evaluation for sector linkages are presented as follows: **Institutional Framework** Agencies (Support Mining Investments) (Yes) Agencies (Monitoring and Compliance) (Yes) Agencies Responsible for Managing Mineral Revenues (Yes) **Social** Local Content (Yes) CSR Policy and guidelines (Yes)	For Ghana, since the L.I.s to build the critical linkages needed in the sector were recently enacted, it was evaluated with a 'yes'.	**Yes**

			Environment Environmental law and due diligence (Yes) Health and Safety (yes)		
Process 5: Managing investment portfolio	**Point of Strategic Assessment:** Considering the current level of development of the economy, are there established transparent institutional processes and mechanisms to set up a fund?	**Institutional Mechanisms for managing a fund**	For institutional mechanism, Ghana's Minerals Commission and the Central Bank of Ghana are well established to run a fund system if needs be. Also, in terms of framework, the Mineral Development Fund- MDF, Act 912 establishes a fund for mining communities. The purpose of the fund is redressing the harmful effects of mining; promoting local economic development; and building mining R & D and capacity of the sector (See MDF Act 912, 2016: Section 4 (a- e), p.4).	For Ghana, the general evaluation was 'yes' because of the existence of institutions and regulations in managing a fund system. Additionally, there have bene direct investments into the economy.	**Yes**
			Existence of a wealth fund.	In terms of existence of a wealth fund, discussion in Chapter Four revealed that none exists for mineral resources.	**No**

Sources: (GoG, 2010, 2011b, 2012a, 2012b, 2012c, 2012e, 2013, 2015, 2016; GoG- GPRS I, 2003; GoG- GPRS II, 2006; GoG- NSDF, 2015a; GoG-PIM, 2015; GoG-GSGDA I, 2010; GoG-GSGDA II, 2014)

Annex 8.2c: Ghana's Policy Instruments for Operationalising the IFRAD Strategy

Instruments	Process 1	Process 2	Process 3	Process 4	Process 5
Legal/ Regulatory Instruments	- Good governance & equity - Transparency, especially for revenues	- Encourage exploration - Compliance and reporting: Rules/codes on the reporting of Resources	- Favourable standards and elements in investment treaties/ agreements	- Realistic downstream processing requirements - Social responsibilities- LC and CSR Guidelines	- Compliance and reporting - Good governance - Transparency, especially for revenues
Economic/ Financial Instruments	- Encourage domestic supply through NMP - Enter into long-term supply contracts (with local companies) - Mobilising investment to contribute to SD	- Mobilising investment to contribute to SD - Integrated mine development (database/ open cadastre system) - Prolonging mine lives	- Competition policies - Mobilising investment to contribute to SD - Encourage exploration - Compliance and reporting: Accounting rules	- Compliance and reporting - Royalties, taxes, levies and rents - CSR/ local content and local participation	- Mobilising investment to contribute to SD - Accounting rules - Risk management
Social Instruments	- Mobilising investment to contribute to SD - Prolonging mine lives	- Government capacity to develop policy and enforce rules, i.e. Competent administration & partnership	- Support R&D to promote substitution	- Compliance and reporting	- Good governance - Transparency, especially for revenues
Institutional Instruments	- Ensuring relevance and effectiveness of development agreements - M & E	- Research and development - Mining database systems and agencies to promote partnerships in exploration	- Compliance and reporting - Good governance - Transparency, especially for revenues	- Training and research centres on mining - Institutions for mining sector governance	- Fund management and administration - Good governance - Transparency, especially for revenues

Source: *Table 7.2*; Chapter Seven

Annex 8.3: South Africa's Evaluation for the IFRAD Strategy

Annex 8.3a: SWOT Analysis of South Africa's Mineral Sector

Strengths	Opportunities
• Matured economy with world class mining assets in gold, PGMs, chromite, etc. • A somewhat robust legal and regulatory environment which supports the mining sector. • Developed mining infrastructure and significant contributions to mining R & D. • Opportunities for downstream value addition.	• New discovery and potential growth in the world economy could propel growth in the sector. • Opportunities for developing mining R & D • Reformed mining sector which is building capacity of its skills base. • Improved efforts in community development with the BBBSEE Mining Charter may improve social licence to operate.
Weaknesses	**Threats**
• Declining ore grades and greater mine depth for economically feasible ores make the cost of mining high. • Intermittent upheavals by labour makes the sector prone to instability and internal shocks. • Although the economy is somewhat robust, frequent amendments to the mining regime heighten mining investment risks. • Trust amongst the actors in the sector is weak due to stakeholders receiving less of what they deem they deserve	• Threats of losing out on mining investments to emerging economies within the region. • There is a deficit in highly skilled mining labour. • Weak demand and volatile gold prices threaten the stability of the sector. • Limited development capital for mining due to rising risks in the industry and declining profitability of the sector.

Sources: Chamber of Mines- South Africa (2016, 2015); Republic of South Africa (2008); Republic of South Africa-DME (2011, 1998); Republic of South Africa-DMR (2010); Republic of South Africa-DTI (2007); Republic of South Africa-Economic Development Department (2010); Republic of South Africa-NPC (2012)

Annex 8.3b: The Inter-linkages between South Africa's Development Frameworks and Investment Policies with the Mining Sector

Elements	Points of Strategic Assessment	Issues		Comments on the Evaluation	Final Evaluation
Process 1: Integrating development objectives with mining	**Points of Strategic Assessment:** What are the country's express development objectives as well as mining's (potential) objectives'? Have they been aligned and has mining been integrated into the national development and industrial policies and strategies of the country?	**Development Frameworks:**	**Long-term Development Framework:** **National Development Plan (NDP) 2030** The National Development Plan aims to eliminate poverty and reduce inequality by 2030. It aims at achieving six priorities: • Uniting all South Africans around a common programme to achieve prosperity and equity. • Promoting active citizenry to strengthen development, democracy and accountability. • Bringing about faster economic growth, higher investment and greater labour absorption. • Focusing on key capabilities of people and the state. • Building a capable and developmental state. • Encouraging strong leadership throughout society to work together to solve problems (Republic of South Africa-NPC, 2011)	The NDP priority areas focus on fast economic growth and higher investments. Its medium term Strategic Framework and the IPAP recognise the role of mining for South Africa's development. Also, the MPRDA aims to use the contributions from the sector for equitable and SD of the economy. Hence, the overall evaluation for South Africa was a 'yes'	**Yes**
		Mining Frameworks:	**Mineral and Petroleum Resources Development Act (MPRDA)** The MPRDA aims to make provisions for equitable access to and sustainable development of the nation's mineral and petroleum resources; and to provide for matters connected therewith. (p.2 of the Act). The objects set the fundamental guiding principles for the Act. It recognises its right of PSONR and aims to promote SD and equitable access to the nation's mineral and petroleum resources to all the people of South Africa (See Section 2 (a- i) of the MPRDA (2002)		
		Industrial Frameworks:	**National Industrial Policy Framework (NIPF)** The Industrial Policy Action Plan (IPAP) is premised on implementing the priority sectors of the- of the NDP is hedged on the NIPF. The core areas of the policy (2017- 2020) are: inclusive growth, empowerment, diversification, localisation; investment in value-adding manufacture, export & labour-intensive economic sectors.		
		Investment Frameworks:	**MPRDA and Protection of Investment Act (PIA), 2015** A different regime (MPRDA) applies to mining investment generally. However, with the nullifying of BITs and IIA, the PIA no. 22 of 2015 also applies. The purpose of the PIA is to: • Protect investment in accordance with and subject to the Constitution, in a manner which balances the public interest and the rights and obligations of investors;		

			• Affirm the Republic's sovereign right to regulate investments in the public interest; • Confirm the Bill of Rights in the Constitution and the laws that apply to all investors and their investments in the Republic (section 4 of the PIA)		
Process 2: Resource potential	**Points of Strategic Assessment:** Is there a national inventory that maps the economic potential of the mineral resource? Have governments set targets on acquiring information on the demonstrated mineral resources that is within its' jurisdiction, and are there on-going projects (government-led, private exploration (joint venture-ship with governments) and or regional-based, aimed at building the geological information of mineral ore bodies in the country?	**Institutions, programmes and projects by government and other partners**	The Council for Geoscience (CGS) provides many services on minerology but with a basic function of geologically mapping South Africa's minerals. It was established under "The Geoscience Act, Act No. 100 of 1993". There are a number of projects on-going by the CGS in partnership with other agencies and sectors. For mining, the CGS provide services such as: Minerals Development Mapping and sampling of ore deposits Mineralogical and physical characterisation Mineral-commodity reports and maps for specific purposes Assistance to small-scale miners Industrial minerals Maintenance of the COREDATA and COAL databases Maintenance of the SAMINDABA mineral-deposits database	From the publications and geological data available from their website. It was observed that in terms of knowledge of the resources and reserves of minerals, the CGS have data for South Africa. Hence, the final evaluation was a 'yes'.	**Yes**
Process 3: Type of mining investment	**Points of Strategic Assessment:** What types of mineral investments exist and is the investment regime competitive? How are current mining investment (development) agreements structured? What new (potential) and current risks have affected the regime and how has it	**Types of mineral investments and is the regime competitive?**	PIA guides South Africa's environment and upholds five of the six core tenets of investment protection. According to investment policy hub and the ECA (2016), South Africa- has over 46 BITs signed with foreign governments within and outside of Africa. The new PIA currently regulates all signed contract with investors. (See UNCTAD, 2017) at: http://investmentpolicyhub.unctad.org/IIA/CountryBits/195) In terms of the competitiveness of the regime, the CIF (see Table 8.2, of Chapter Eight) did show that the economy is competitive vis-à-vis the global environment.	In terms of the competitiveness of the regime and structure of investments, it was concluded from the CIF that South Africa remains a competitive economy and an attractive destination for FDIs. It remains a stable regime despite the downgrade by Moody. Thus, receiving the evaluation of 'competitive'.	**Competitive**

	affected mining investments?				
Process 4: Mining sector linkages	**Points of Strategic Assessment:** Have effective safeguards been established in the legislative framework to support mining sector agencies? In terms of building critical mining sector linkages, is the economy's local content and CSR policies well integrated with its fiscal policy?	**The focus is on LC and CSR and institutions that support mineral sector linkages and governance**	Here the emphasis was the on the Broad-Based Black Socio-Economic Mining Charter. As a pacesetter, the Mining Charter (2004) and it's 2010 & 2017 amendments under Act. (100) sections (1) and (2) laid the foundation for a local content strategy for equitable access and the SED of the sector. The Charter sets targets and benchmarks on (10) core issues of (ownership, beneficiation, employment equity, human resource development, mining community development, local procurement and enterprise development, housing and living conditions, SD and growth of the industry and reporting aimed at compliance) within the three components of sustainable development for the mining industry. The Charter has stipulations which cover the local content instruments and aims to empower those that were disadvantaged under the former apartheid regime. Thus far, there have been three renditions (2004; 2010; 2017). This is administered by the DMR in partnership with prominent stakeholders such as the Chamber of Mines. The third rendition of the charter has come under heavy criticism (see arguments by Leon, Leyden, and Müller, 2017; Matthew, 2017). Some of the uncertainty lay in the ownership targets and its inter-linkages with the Beneficiation Strategy (launched in 2011) for miners. For the new Charter III, the requirements would need further deliberation with industry players and all stakeholders, to ensure that all parties agree on the way forward with amending the new requirements, particularly where uncertainty exists. Based on the evaluation of the regime, the elements and their evaluation for sector linkages are presented as follows: **Institutional Framework** Agencies (Support Mining Investments) (Yes) Agencies (Monitoring and Compliance) (Yes) Agencies Responsible for Managing Mineral Revenues (Yes) **Social** Local Content (Yes) CSR Policy and guidelines (Yes) **Environment** Environmental law and due diligence (Yes) Health and Safety (yes)	For South Africa in this case, the Mining Charter is a strong LC instrument with stakeholder buy-in. Hence, it was evaluated with a 'yes'	**Yes**

Process 5: Managing investment portfolio	**Point of Strategic Assessment:** Considering the current level of development of the economy, are there established transparent institutional processes and mechanisms to set up a fund?	**Institutional Mechanisms for managing a fund**	The regime has the enabling environment and institutions to manage a wealth fund should it so decide. The Department of Mineral Resources, Department of Trade and Industry, Investment Promotion Agencies (IPAs), Trade and Investment South Africa, and the South African Reserve Bank are in a position to manage such a fund.	The general evaluation here was a 'yes' because of the existence of institutions to manage a fund. Additionally, there have been direct investments into the economy.	**Yes**
			Existence of a wealth fund.	In terms of existence of a wealth fund, discussion in Chapter Four revealed that none exists for mineral resources.	**No**

Sources: Republic of South Africa (2015, 2015, 2002, 1998); Republic of South Africa-DMR (2010, 2010, 2010, 2004); Republic of South Africa-DTI (2016, 2007); Republic of South Africa-Economic Development Department (2011, 2010, 2010); Republic of South Africa-NPC (2012)

*The elements within the Social Labour Plans and guidelines for mining were not included in the general analysis since the focus was on main mining and development frameworks and legislation.

Annex 8.3c: South Africa's Policy Instruments for Operationalising the IFRAD Strategy

Instruments	Process 4	Process 5
Legal/ Regulatory Instruments	- Realistic downstream processing requirements - Environmental management - Compliance and reporting - Good governance - Transparency, especially for revenues and the mining Law	- Act to regulate the management of the fund - Compliance and reporting - Good governance - Transparency, especially for revenues
Economic/ Financial Instruments	- Prolonging mine life - Realistic downstream processing requirements (beneficiation) - Compliance and reporting - Royalties, taxes, levies and rents	- Mobilising investment to contribute to SD - Good governance - Transparency, especially for revenues - Risk management
Social Instruments	- Government capacity to develop policy and enforce rules, i.e. Competent administration - Prolonging mine life - Encourage exploration - Appropriate ASM rules - Compliance and reporting	- Mobilising investment to contribute to SD - Compliance and reporting - Good governance - Transparency, especially for revenues
Institutional Instruments	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues - Training and research centres on Mining	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues - Fund management and administration

Source: *Table 7.2*; Chapter Seven

Annex 8.4: Tanzania's Evaluation for the IFRAD Strategy

Annex 8.4a: SWOT Analysis of Tanzania's Mineral Sector

Strengths	Opportunities
• Tanzania has world class mineral assets not only in gold but in uranium, oil and gas of which about 90% of the resources have been geographically mapped. • Its fiscal regime is competitive in comparison with other global gold mining players. • A peaceful socio-political environment and increasing mindfulness for the rule of law. • Many incentives to promote private capital (investments) in exploration in the mining sector.	• New discoveries in uranium and oil and gas makes it potentially a mining power house. • Its liberalised development agenda has led to legal support through mining legislation and its industrialisation policies. • A focus on the competitiveness and resilience of its economy means that investors in mining have preferential treatment.
Weaknesses	**Threats**
• Mining sector is weakly linked with other sectors of the economy. • The high dependence on foreign private capital by a few source countries (i.e. South Africa, Britain and Canada) leave the sector susceptible to external shocks. • Weak capacity of the mining administrators to effectively monitor the sector from exploration to pre-fabrication. • Inadequate mining infrastructure, particularly energy may result in the loss of mining investments.	• Threat of losing mining investments to other countries within the Eastern African region. • Mining skills and labour gap in Tanzania. • Changes to the fiscal regime (i.e. ban of unprocessed concentrates) may lead to flight of foreign capital. • Weak demand from China and India can make mines unprofitable.

Sources: The United Republic of Tanzania (2008, 2015), Tanzania Minerals Audit Agency- TMAA (2015, 2016)

Annex 8.4b: The Inter-linkages between Tanzania's Development Frameworks and Investment Policies with the Mining Sector

Elements	Points of Strategic Assessment	Issues		Comments on the Evaluation	Final Evaluation
Process 1: Integrating development objectives with mining	**Points of Strategic Assessment:** What are the country's express development objectives as well as mining's (potential) objectives'? Have they been aligned and has mining been integrated into the national development and industrial policies and strategies of the country?	**Development Frameworks:**	**Long-term Development Framework:** **Tanzania's Development Vision (TDV) 2025** The TDV is premised on a good quality life, good governance and rule of law and a competitive economy. It sets out the development agenda for the country with its medium-term frameworks (the National Strategy for Poverty Reduction) known as MKUKUTA I & II. These have been framed to meet the development obligations indicated in the TDV 2025. The link between its mining policy and development vision 2025 has also been acknowledged with the Ministry of Energy and Mines (MEM) contending that both the policy and law seek to ensure an "effective minerals sector, contributing significantly to the acceleration of socio-economic development through SD and utilisation of mineral resources in Tanzania by 2025" (The United Republic of Tanzania, 2015b, p.26). **Medium-term Development Frameworks:** The National Strategy for Poverty Reduction) known as MKUKUTA I & II was framed to meet the TDV 2025. The Five-Year Development Plan (FYDP) I and II. The FYDP II (2016/17- 2020/21) aims at developing a competitive economy and to catapult Tanzania into a middle-income country. It was launched as a vehicle to transition the TDVs long term plan to recognise the role that mining plays in the development of the economy. The fundamental considerations in the second FYD (2016/17- 2020/21) incorporates mining and hence has designed interventions to improving value addition, skills development and training and the fiscal regime to gain more benefit from mining.	The link between its mining frameworks and development frameworks have been established. Hence, it was evaluated with 'yes'.	**Yes**
		Mining Frameworks:	**The Mining Act of Tanzania, Act. No.14 of 2010** The principles of the Act are captured in its mining policy. The MEM suggests that the law and policy seek to ensure an "effective minerals sector, contributing significantly to the acceleration of socio-economic development through SD and utilisation of mineral resources in Tanzania by 2025" (MEM, 2015: Investment Guide of Tanzania, p.26). The policy sets the goals for developing the sector, the ASM sector, exploitation of minerals, value addition and building local content of the economy.		
		Industrial Frameworks:	**Sustainable Industrial Development Policy for Tanzania (SIDP 2020)** The SIDP was the replacement to the basic industrial policy of the 1970s. Crafted in 1996, it was to liberalise the economy by building the capacities of the productive and manufacturing sectors, such as agriculture and mining for growth.		

			Tanzania's Integrated Industrial Development Strategy (IIDS) 2025 The IISD aims at creating strategies that will enhance the realisation of the SIDP. The IIDS 2025 creates a platform to enable Tanzania to industrialise using its natural resources whiles concurrently working to achieve the goals in the TDV 2025.		
		Investment Frameworks:	The Tanzania Investment Act of 1996. The effects of the National Investment Promotion Policy in 1996 augmented the minerals sector for three reasons: 1) it argued for mechanisms to manage the minerals sector; 2) promote ASM- by establishing the legal and institutional mechanisms for regulation; and 3) intervention for competitiveness through encouraging investments in exploration, mining and market of miners (The United Republic of Tanzania, 1996). This resulted in the liberalised and private sector development approach to its mining and industrial policies. For the mining sector, the Mining Act, No.14 applies a special regime to mining investors, with contract specification in the MDAs stipulated in the Act.		
Process 2: Resource potential	**Points of Strategic Assessment:** Is there a national inventory that maps the economic potential of the mineral resource? Have governments set targets on acquiring information on the demonstrated mineral resources that is within its' jurisdiction, and are there on-going projects (government-led, private exploration (joint venture-ship with governments) and or regional-based, aimed at building the geological information of mineral ore bodies in the country?	**Institutions, programmes and projects by government and other partners**	The Geological Survey of Tanzania (GST) is the government agency mandated to acquire and store geological data. The GST asserts that it collects basic data on geological mapping and geo-data management. It provides other general services such as mapping and sampling of ore deposits and providing mineralogical and physical characterisation of orebodies to the public and private sectors. From their website, it was stated that many projects are currently on-going with other agencies and development partners in the region. However, since targets for building the geological data have not been set in the mining regulations, it did not receive a full 'yes'.	The evaluation was a 'yes/no'	**Yes/No**

Process 3: Type of mining investment	**Points of Strategic Assessment:** What types of mineral investments exist and is the investment regime competitive? How are current mining investment (development) agreements structured? What new (potential) and current risks have affected the regime and how has it affected mining investments?	**Types of mineral investments and is the regime competitive?**	Tanzania has investment treaties with a number of countries in and outside Africa and with 'bilateral' with other development partners. The CIF discussed the competitiveness of the regime vis-a-vis global players and concluded that the country is competitive. Although, for IFRAD this is maintained, it must be noted that Tanzania just passed three laws: the Natural Wealth and Resources (Permanent Sovereignty); the Natural Wealth and Resources Contracts (Review and Re-negotiation of Unconscionable Terms); and the Written Laws (Miscellaneous Amendments) of 2017 to ensure a more favourable regime for the State (See The United Republic of Tanzania 2017b, [a] 2017). These laws give the State new powers of control over mining contracts through the PSONR and the power to renegotiate already existing contracts agreed in the MDAs. It also aims to change the fiscal regime by increasing royalties from 4% to 6% for gold and 5% to 6% for uranium. Logically, such a drastic regime change could serve as a disincentive to investments into Tanzania and raise the risk profile of the country to levels that negate the competitiveness that the country has achieved. However, despite the regime change, Tanzania is still rated as a competitive regime.	Based on the CIF assessment and it investment environment, the evaluation for Tanzania remains competitive to attract investments.	**Competitive**
Process 4: Mining sector linkages	**Points of Strategic Assessment:** Have effective safeguards been established in the legislative framework to support mining sector agencies? In terms of building critical mining sector linkages, is the economy's local content and CSR policies well integrated with its fiscal policy? Have government been successful in managing various risks factors which influence mining investments?	**The focus is on LC and CSR and institutions that support mineral sector linkages and governance**	The institutional mechanism exists for LC and CSR monitoring. On HSE and environmental management, there are regulations. In the law, Sections 47- 53 of Act 2010 stipulate some form of LC for local economic development. But, there is need for government to set local 'local' standards and build capacity and guidelines for monitoring compliance. Based on the evaluation of the regime, the elements and their evaluation for sector linkages are presented as follows: **Institutional Framework** Agencies (Support Mining Investments) (Yes) Agencies (Monitoring and Compliance) (Yes) Agencies Responsible for Managing Mineral Revenues ((Yes) **Social** Local Content (Yes/No) CSR Policy and guidelines (Yes/No) **Environment** Environmental law and due diligence (Yes) Health and Safety (yes)	For Tanzania, the existence of institutional mechanisms to support mining sector linkages and to an extent having some LC instruments led to the country being positively evaluated with a 'yes/no' in some instances. 'Yes/no' because in some cases institutional mechanism exist but no specific regulation (especially for local content and guidelines for	**Yes/No**

				monitoring compliance).	
Process 5: Managing investment portfolio	**Point of Strategic Assessment:** Considering the current level of development of the economy, are there established transparent institutional processes and mechanisms to set up a fund?	**Institutional Mechanisms for managing a fund**	The regime has the enabling environment and institutions to manage an SED fund. The legal framework to support this endeavour exists with the MEM spearheading such an initiative.	The general evaluation here was a 'yes' because of the existence of the stated institutions. Additionally, there have been direct investments into the economy from mining.	**Yes**
			Existence of a wealth fund.	In terms of existence of a wealth fund, discussion in Chapter Four revealed that none exists for mineral resources.	**No**

Sources: The United Republic of Tanzania (2008, 2011, 1996); Biashara (1996); The United Republic of Tanzania (2009); United Republic of Tanzania (URT) (2010, 2006); The United Republic of Tanzania (1996, 2010, 2015b, 2003); The United Republic of Tanzania- FYDP I (2011); The United Republic of Tanzania- FYDP II (2016); UNCTAD (2002)

Annex 8.4c: Tanzania's Policy Instruments for Operationalising the IFRAD Strategy

Instruments	Process 1	Process 2	Process 3	Process 4	Process 5
Legal/ Regulatory Instruments	- Good governance & equity - Transparency, especially for revenues	- Encourage exploration - Compliance and reporting: Rules/codes on the reporting of Resources	- Compliance and reporting - Good governance - Transparency, especially for revenues - Favourable standards and elements in investment treaties/ agreements	- Setting standards for downstream processing - Environmental management - Rules and guidelines for social responsibilities in mining - Compliance and reporting - Fiscal rules	- Act to regulate the management of SED fund - Compliance and reporting - Good governance - Transparency, especially for revenues
Economic/ Financial Instruments	- Encourage domestic supply through NMP - Enter into long-term supply contracts (with local companies) - Mobilising investment to contribute to SD	- Mobilising investment to contribute to SD - Integrated mine development (database/ open cadastre system) - Prolonging mine lives	- Trade and tariff policy - Competition policies - Mobilising investment to contribute to SD - Compliance and reporting: Accounting rules	- Integrated mine development - Compliance and reporting - Royalties, taxes, levies and rents - CSR/ local content and local participation - Enterprise development	- Mobilising investment to contribute to SD - Accounting rules - Good governance - Risk management
Social Instruments	- Mobilising investment to contribute to SD - Prolonging mine lives	- Government capacity to develop policy and enforce rules, i.e. Competent administration & partnership	- Support R&D to promote substitution - Mobilising investment to contribute to SD - Government capacity to develop policy and enforce rules, i.e. Competent administration	- Government capacity to develop policy and enforce rules, i.e. Competent administration - Prolonging mine lives - Appropriate ASM rules - Environmental management and health and safety - Compliance and reporting	- Mobilising investment to contribute to SD - Compliance and reporting - Good governance - Transparency, especially for revenues
Institutional Instruments	- Ensuring relevance and effectiveness of development agreements - M & E	- Research and development - Mining database systems and agencies to promote partnerships in exploration	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues	- Compliance and reporting - Good governance - Transparency, especially for revenues - Training and research centres on Mining - Institutions for mining sector governance	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues - Fund management and administration

Source: *Table 7.2*; Chapter Seven

Annex 8.5: The DRC's Evaluation for the IFRAD Strategy

Annex 8.5a: SWOT Analysis of the DRC's Mineral Sector

Strengths	Opportunities
• DRC has world class mineral assets that are yet to be developed. • Its geographic location makes it well poised as a hub for the integration of Central Africa and the development of regional infrastructure. • It has a fairly competitive regime in comparison with other global developing mining players in the region.	• New discoveries and exploration of the 3Ts (Tin, Tungsten and Tantalum) together with other associated minerals make the DRC a potential mining power house. • The fiscal regime is relaxed compared to other traditional mining players with many incentives available to miners. • Significant ASM sector that can be used for rural economic transformation
Weaknesses	**Threats**
• Inadequate infrastructure, specifically mining infrastructure makes the cost of mining high. • The socio-political environment is fragile hence a significant risk to mining investments. • The dependence on foreign capital makes the economy also susceptible to external shocks. • Weak governance and capacity of the mining administrators to monitor the sector.	• Threat of losing mining investments to other players in the region. • High illegal ASM activity could threaten the stability of DRCs mining regions if not regulated. • Limited human capital increases the risk of mining investments. • For the DRC, China buys 50% of its minerals, thus a weak demand can cripple MNCs and the economy's dependence.

Sources: DRC (2002); DRC- GPRSP 2 (2011); Chamber of Mines- DRC (2016, 2015); AfDB (2017)

Annex 8.5b: The Inter-linkages between the DRC's Development Frameworks and Investment Policies with the Mining Sector

Elements	Points of Strategic Assessment	Issues		Comments on the Evaluation	Final Evaluation
Process 1: Integrating development objectives with mining	**Points of Strategic Assessment:** What are the country's express development objectives as well as mining's (potential) objectives'? Have they been aligned and has mining been integrated into the national development and industrial policies and strategies of the country?	**Development Frameworks:**	**Long-term Development Framework:** **The RDC Long-term Development Plan** **Medium-term Development Framework** **The Growth and Poverty Reduction Strategy Paper I and II** The GPRSP II aims to • strengthen governance and consolidation of peace; • enhance economic diversification, acceleration of growth and employment promotion; • improve access to basic social services and building human capital; and • provide environmental protection and climate change control (Government of DRC- GPRSP II, 2011). The PRSP II acknowledges the significance of mining's contribution to growth and development of the country (see pages 40- 61 of the Government of DRC- GPRSP II, 2011). The challenge of a long-term plan (or mining policy) to frame principles to guide the sector was absent. **National Development Strategy for SMEs (2016) and its Action Plan (2017- 2021)** The government recently launched the SME medium term strategy to promote SMEs and the development of sustainable and inclusive growth of the economy. The objectives of the Strategy are premised on: i) strengthening the institutional frameworks for SMEs; ii) providing support services to SMEs; iii) financing; iv) training of SMEs; and v) providing the necessary market infrastructure for enhancing SME development.	Based on the identified issues, and the fact that DRC is currently finalising its development plan for the next five years, it was evaluated with 'yes/no'. In terms of alignment with its development vision, the GPRSP 2 has recognised the need for a minerals sector strategy (or policy), which aims to link its development visions with the objectives of its mining economy.	**Yes/No**
		Mining Frameworks:	**Mining Code (Law No. 007/2002)** The mining code sets the principles and requirements which guides mining investments in the DRC. Due to notable challenges such as laxity in the fiscal regime and lack of clear guidelines on the sector linkages, it has been difficult to monitor compliance of the regime's requirements.		

		Investment Frameworks:	**The Investment Code of 2002** regulates general investments in the DRC and establishes the National Investment Promotion Agency (Agence Nationale pour la Promotion des Investissements- ANAPI) to coordinate mining investments in the DRC.		
Process 2: Resource potential	**Points of Strategic Assessment:** Is there a national inventory that maps the economic potential of the mineral resource? Have governments set targets on acquiring information on the demonstrated mineral resources that is within its' jurisdiction, and are there on-going projects (government-led, private exploration (joint venture-ship with governments) and or regional-based, aimed at building the geological information of mineral ore bodies in the country?	**Institutions, programmes and projects by government and other partners**	Although the E- & Y (2012) and USGS (2012) provide data on the mineral resources and basic knowledge on reserves and resources, as an emerging mineral economy, the DRC is gradually equipping its economy with capacity and geological information of its mineral resources. The PROMINES and the Geology Department work with government agencies to promote the development of mining in the economy. It recently validated a new geological map for the DRC to cover the extent of new mineral resources. Despite the challenge of data, the DRC has partnered with the World Bank and the EU to build capacity of the staff at Promines.	Limited data to make any robust evaluation. However, because of the existence of mining sector agencies, under process 2, the DRC was evaluated with a 'Yes/No'	**Yes/No**

Process 3: Type of mining investment	**Points of Strategic Assessment:** What types of mineral investments exist and is the investment regime competitive? How are current mining investment (development) agreements structured? What new (potential) and current risks have affected the regime and how has it affected mining investments?	**Types of mineral investments and is the regime competitive?**	The DRC's mining regime remains competitive based on the assessment in CIF. The CIF discussed the competitiveness of the regime vis-à-vis a global player.	Based on the CIF assessment and it investment environment, the evaluation for DRC remains competitive to attract investments.	**Competitive**
Process 4: Mining sector linkages	**Points of Strategic Assessment:** Have effective safeguards been established in the legislative framework to support mining sector agencies? In terms of building critical mining sector linkages, is the economy's local content and CSR policies well integrated with its fiscal policy? Have government been successful in managing various risks factors which influence mining investments?	**The focus is on LC and CSR and institutions that support mineral sector linkages and governance**	Based on the evaluation of the regime (mining code and mining sector regulations), the elements and their evaluation for sector linkages are presented as follows: **Institutional Framework** Agencies (Support Mining Investments) (Yes) Agencies (Monitoring and Compliance) (Yes/No) Agencies Responsible for Managing Mineral Revenues (Yes) **Social** Local Content (No) CSR Policy and guidelines (Yes/No) **Environment** Environmental law and due diligence (Yes) Health and Safety (yes)	For DRC, the existence of some of the institutional mechanisms to support the mining sector led to a positive evaluation in some cases and 'no' in others. But, overall, it was evaluated with a 'yes'.	**Yes**

Process 5: Managing investment portfolio	**Point of Strategic Assessment:** Considering the current level of development of the economy, are there established transparent institutional processes and mechanisms to set up a fund?	**Institutional Mechanisms for managing a fund**	The regime has the enabling environment and institutions. PROMINES, Mining Ministry and the Central Bank can manage a fund for SED. But limited by corruption and weak governance.	The general evaluation here was a 'yes' because of the existence of mining sector agencies and institutions. However, administrative bottlenecks and lack of capacity limit the effective functioning of such institutions. Additionally, there have been direct investments into the economy.	**Yes**
			Existence of a wealth fund.	In terms of existence of a wealth fund, discussion in Chapter Four revealed that none exists for mineral resources.	**No**

Sources: DRC (2002b, 2002a); DRC- GPRSP 2 (2011); Chamber of Mines- DRC (2015, 2016); DRC- PRSP (2006); DRC-Interim-PRSP (2004)

Annex 8.5c: DRC's Policy Instruments for Operationalising the IFRAD Strategy

Instruments	Process 1	Process 2	Process 3	Process 4	Process 5
Legal/ Regulatory Instruments	- International (soft) law - Trade and tariff policy - Competition policies - Appropriate ASM rules - Good governance & equity - Transparency, especially for revenues	- Encourage exploration - Compliance and reporting: Rules/codes on the reporting of Resources	- Encourage exploration - Compliance and reporting - Good governance - Transparency, especially for revenues - Favourable standards and elements in investment treaties/ agreements	- Appropriate ASM rules - Environmental management - Social responsibilities - Compliance and reporting - Good governance - Transparency, especially for revenues - Fiscal rules	- Good governance - Transparency, especially for revenues - Compliance and reporting
Economic/ Financial Instruments	- International (soft) law - Mobilising investment to contribute to SD - Appropriate ASM rules	- Encourage exploration and mine development - Mobilising investment to contribute to SD - Integrated mine development (database/ open cadastre system) - Prolonging mine lives	- Trade and tariff policy - Competition policies - Mobilising investment to contribute to SD - Encourage exploration - Compliance and reporting: Accounting rules	- Integrated mine development - Prolonging mine life - Compliance and reporting - Royalties, taxes, levies and rents - CSR/ local content and local participation - Enterprise development	- Mobilising investment to contribute to SD - Accounting rules - Good governance - Transparency, especially for revenues - Risk management
Social Instruments	- Mobilising investment to contribute to SD - Prolonging mine life - Environmental management - Social responsibilities	- Government capacity to develop policy and enforce rules, i.e. Competent administration - Prolonging mine life	- Mobilising investment to contribute to SD - Government capacity to develop policy and enforce rules, i.e. Competent administration	- Government's capacity to develop policy and enforce rules, i.e. Competent administration - Integrated mine development - Prolonging mine life - Appropriate ASM rules - HSE rules - Social responsibilities	- Mobilising investment to contribute to SD - Compliance and reporting - Good governance - Transparency, especially for revenues

Institutional Instruments	- Ensuring relevance and effectiveness of mining - M & E - Good governance - Transparency, especially for revenues	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues - Training and research centres on Mining - Institutions for mining sector governance	- Ensuring relevance and effectiveness of mining - Compliance and reporting - Good governance - Transparency, especially for revenues - Fund management and administration

Source: *Table 7.2*; Chapter Seven