

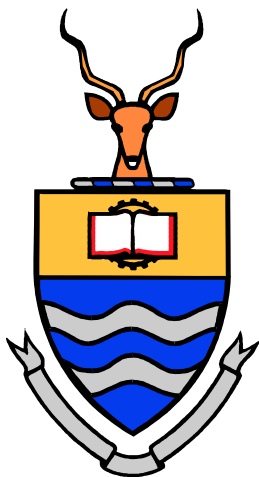
# **RESEARCH TOPIC 5**

## **MINING, MINERALS AND ECONOMIC DEVELOPMENT AND THE TRANSITION TO SUSTAINABLE DEVELOPMENT IN SOUTHERN AFRICA**

**SEPTEMBER 2001**

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## Contents

1. THE CONTRIBUTION OF THE MINING AND MINERALS SECTOR TO THE ECONOMIC DEVELOPMENT OF SOUTHERN AFRICA.....	5
Summary.....	6
1.0 Growth in the global economy.....	7
2.0 Mining in the SADC Region.....	13
2.2 Employment in the SADC Mining Industry.....	30
3.0 PERFORMANCE OF MAJOR MINERALS.....	34
4.0 DEVELOPMENTS IN SADC MEMBER STATES.....	53
4.2. Policy and Administration Changes.....	65
4.2.2 Administration of the Sector.....	72
5.0. Geological exploration and mapping.....	74
6.0 Globalisation.....	89
7.0 Dutch Disease.....	94
8.0 South Africa : a case study.....	97
9. Summary.....	111
References.....	112
2. ALIGNING MINERAL WEALTH WITH SUSTAINABLE DEVELOPMENT: THE SOUTHERN AFRICAN PERSPECTIVE.....	114
1 MINERAL RENT: THE ESSENTIAL INGREDIENT OF THE WEALTH PIE	117
2 DEFINING RENT SHARING RATIOS FOR DISCUSSION PURPOSES ..	120
3 SHARING THE RENT: DISCUSSING THE WEALTH PIE.....	124
4 COLLECTION OF PUBLIC RENT IN SOUTHERN AFRICA.....	136
5 VISIBILITY OF MINERAL RENT IN THE ECONOMIES OF SOUTHERN AFRICA.....	141
6 ALIGNING SOUTHERN AFRICAN POLICIES WITH SUSTAINABLE DEVELOPMENT.....	153
References.....	159
3. A CASE STUDY ON THE PRIVATISATION OF ZAMBIA CONSOLIDATED COPPER MINES.....	164
INTRODUCTION.....	168
1.1 THE RATIONALE OF THE STUDY.....	168
2.0 RATIONALE TO PRIVATISATION.....	171
4.0 PRIVATISATION.....	175
4.1 AIMS AND OBJECTIVES OF PRIVATISATION OF ZCCM.....	176
4.2 ZCCM PRIVATISATION TEAM.....	176
5.0 LONG-TERM SUSTAINABLE DEVELOPMENT.....	178
6.0 BENEFITS RESULTING FROM PRIVATISATION OF ZCCM.....	179
7.0 LACK OF BENEFITS RESULTING FROM PRIVATISATION OF ZCCM.....	182
8.0 LACK OF INFLOW OF MINERAL RENTS.....	189
9. RECOMMENDATIONS.....	192
9.1 THE WAY FORWARD.....	192
10.0 REFERENCES.....	195
MINING DEPARTMENT.....	197
4. ENSURING THE MINING SECTORS CONTRIBUTION TO SUSTAINABLE ECONOMIC DEVELOPMENT.....	204
a. Life-cycle management 36.....	206

1.	INTRODUCTION .....	209
a.	Drivers of change towards sustainability.....	209
2.	THE CASE FOR SUSTAINABLE DEVELOPMENT OF MINERALS AND METALS.....	211
1	INTRODUCTION.....	222
2.	SUSTAINABLE OPERATIONS .....	239
a	Life-cycle management .....	239
3.	MINERALS EXPLORATION AND DEVELOPMENT .....	249
4.	MANAGING MINERAL REVENUES .....	261
5.	SOCIAL INFRASTRUCTURE.....	277

## INTRODUCTION

This report is a compilation of four independent studies that cover the terms of reference for **RESEARCH TOPIC 5: MINING, MINERALS AND ECONOMIC DEVELOPMENT AND THE TRANSITION TO SUSTAINABLE DEVELOPMENT IN SOUTHERN AFRICA**. The objective of the MMSD southern African Regional Project (MMSD SOUTHERN AFRICA) is to identify how the mining and minerals sector can best contribute to the Southern African transition to sustainable development. The objective of this study is to determine how the mining and minerals sector can best contribute to the Southern African regional transition to sustainable development in terms of economic development.

The research team comprised staff members of the School of Mining Engineering, at the University of the Witwatersrand and include Dr FT Cawood, Mr AS Macfarlane and Professor RCA Minnitt (Research Coordinator). Mr Sam Kangwa of the Copperbelt University, Kitwe, Zambia was subcontracted to undertake an analysis of the Privatisation of Zambia Consolidated Copper Mines.

## TERMS OF REFERENCE

The terms of reference for this research topic are separated into three specific topics dealt with by individual researchers as follows:

**AS Macfarlane:** Review, using existing knowledge, the contribution of the mining and minerals sector to economic development in Southern Africa, paying particular attention to the progression of development from primary to tertiary activities and the linkage between managing mineral wealth and social development. This portion is largely descriptive and is focused on the current state of affairs.

**FT Cawood:** Identify approaches and strategies used by various role players in aligning the economic contribution of the mining and minerals sector with sustainable economies in the region. Comment on the potential for the sector to play a role in poverty alleviation/eradication including an evaluation of best

practice with respect to the use of mineral rents/funds captured by government. Compare to international experience wherever appropriate.

**S Kangwa:** A case study on the privatisation of Zambia Consolidated Copper Mines (ZCCM) will be used for this section.

RCA Minnitt: Identify guidelines, methods, principles and governance arrangements that can improve and help ensure the sector's contribution to sustainable economic development. Include recommendations on key roles and responsibilities of role players. Use will be made of best and worst practice case studies. Lessons learnt from these case studies will be extracted and synthesized so that the mining and minerals sector in the region can improve future performance.

# **1. THE CONTRIBUTION OF THE MINING AND MINERALS SECTOR TO THE ECONOMIC DEVELOPMENT OF SOUTHERN AFRICA**

**SEPTEMBER 2001**

**AS Macfarlane**

**School of Mining Engineering**

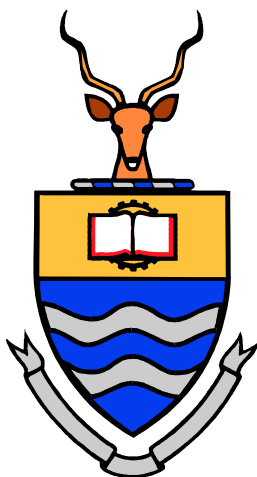
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# **The contribution of the mining and minerals sector to the economic development of Southern Africa.**

Alastair Macfarlane

## ***Summary***

This report summarises the contribution that the minerals industry has made to the economic development of Southern Africa, by analyzing the activity and environment, predominantly over the last nine to ten years.

The report identifies that sustainable development of the industry relies on its economic success, to generate sufficient wealth from the mineral rents to satisfy the requirements of the owners, as well as satisfying the requirements for capital generation, for reinvestment in project and social capital.

It is clear that this can only be achieved through capital investment and operational success, and that this only happens when the climate for investment is favourable. In Southern African countries, there is a very clear linkage between political and social stability, and capital investment from global institutions. This stability must be manifested on a regional basis, since global competitiveness of the industry will only be achieved if the regional economy is able to provide appropriate infrastructure, free trade and movement of capital and goods, in order that the industry can achieve benefits in terms of economies of scale and access to world markets.

There is no shortage of mineral endowment in the region, and responsible exploitation of its mineral resources will contribute significantly to its success. However, there are threats to this development, in terms of the “curse of resource endowment” having negative effects on other aspects of the economies, especially in countries that have been devastated by war and natural disaster, and whose mineral wealth remains untapped.

Furthermore, autocratic and non-democratic processes being enacted in certain countries do not bode well for the future of the economic block, and its minerals industry.

## 1.0 Growth in the global economy.

Growth, expressed in terms of Gross Domestic Product, in the SADC region for the year 2000, showed an improvement to 3.5%, which was a considerable improvement on previous performance, of the previous 3 years. (See figure 1).

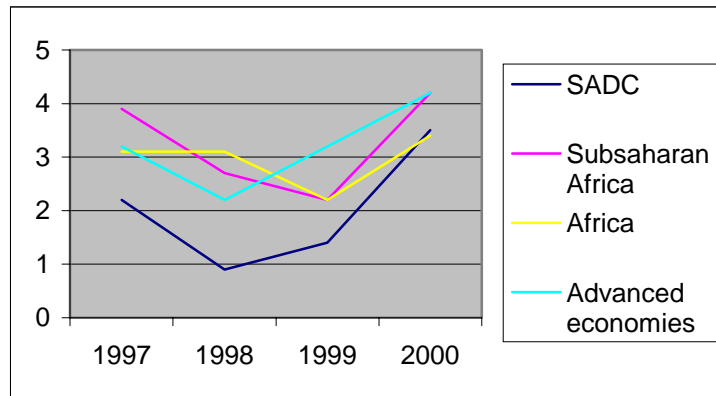


Figure 1. GDP 1997 to 2000. Source: *IMF World Economic Outlook*.

Despite this, inspection of figure 1 shows that although this upswing in performance followed both a continental and international trend, the performance was poorer than that of the larger regions and blocks.

Global growth was estimated at 4.7 per cent in 2000, compared to 3.4 per cent in 1999.

Growth in developing countries, by contrast, grew from 3.8 per cent in 1999 to 5.6 per cent in 2000.

Whilst the turnaround in the Southern Africa region is encouraging, it has been driven essentially by increased activity in the manufacturing, real estate, transport and communications sectors, coupled with various reforms in economic policy, and regional political stability, relative to the past.

Furthermore, these changes in trends are from a statistically short base.

The IMF has commented that the growth performance of Sub Saharan Africa has been “weak by most standards. The average real per capita income in 1998 was roughly unchanged from its level in 1970.”



Furthermore, “This average performance masks significant differences across countries, however, and is strongly affected by developments in the two largest economies, South Africa and Nigeria, which in 1998 together accounted for almost 30% of the region’s total output (in terms of purchasing power parities). Out of the 47 SSA countries, the nine fastest growing economies achieved average annual growth of 3.1 per cent in real per capita incomes over the past 30 years. In the nine slowest growing economies, real per capita income contracted by 2 per cent per year on average, owing in some cases to armed conflicts and political instability”.

Indeed, countries which realized improvements during the second half of the 1990s did so, according to the IMF, as a result of policy improvements, and recovery from armed conflict, in countries such as Angola, Ethiopia, Mozambique and Rwanda. Countries which showed a contraction of more than 1 per cent in growth rates over this period, were predominantly those that experienced civil war ( Burundi, Democratic Republic of Congo, Comores, Djibouti, Guinea-Bissau, Sierra Leone and Zambia).

Table 1: Gross Domestic Product (Real Growth Rates in SADC), 1997 - 2000

Country	1997	1998	1999	2000 *
Angola	5.9	1.7	4	7
Botswana	6.9	8.3	4.2	6.5
Democratic Republic of Congo	-6.4	-3.5	-5	5
Lesotho	3.5	-5.8	2	4
Malawi	5.3	6.2	4.2	3
Mauritius	5.2	5.6	5.4	5
Mozambique	6	9.9	9	8
Namibia	2.4	2.6	2.4	2.5
Seychelles	7.9	3	1.2	2
South Africa	1.7	0.6	1.2	3.5
Swaziland	3.8	2.5	2	3
Tanzania	3.3	4	4.8	5.5
Zambia	3.5	-1.8	2	3.5
Zimbabwe	2	1.6	0.5	-3
<b>SADC</b>	2.2	0.9	1.4	3.5
<b>Subsaharan Africa</b>	3.9	2.7	2.2	4.2
<b>Africa</b>	3.1	3.1	2.2	3.4
<b>Advanced Economies</b>	3.2	2.2	3.2	4.2

Source: IMF World Economic Outlook and SADC member States

\* Preliminary

The IMF has concluded that a number of factors have contributed to the relatively poor performance of economies in Sub Saharan Africa, these being:

- An imbalance in the levels of governmental spending, especially in the area of military spending to support conflict, which detracts from spending on value adding activities in the economy
- A shortage of human capital, as a result of low levels of literacy in slow growth countries, loss of high level skills, and the deleterious effects of inadequate health care
- A shortage of private and corporate investment, resulting in poor productivity of capital. This may be as a result of unfavourable investment climates, poor infrastructure or political instability, coupled with high perceived risks.
- A wide range of progress on macroeconomic stabilization policies, with the result that countries with lower inflation rates and fiscal deficit to GDP ratios, have exhibited higher growth rates than those with higher rates. This causal relationship is important as an indicator of the potential of the Region to increase growth rates in the future, and an examination of these rates among SADC countries shows encouraging trends ( table 1)
- Slow progress in trade and exchange liberalization in countries with low growth rates. Regional trade arrangements and agreements have allowed the region to make firm progress in these areas, but generally the region still lags behind other developing regions in this regard.
- Restrictive or imbalanced structural policies and sectoral composition of output. Countries, notably South Africa, Namibia and Botswana have moved forward in this regard with privatization of parastatal industries, a move which has opened the economies more to the effects of market forces, in regional and global economies.

In order to move towards sustainable economic growth, the IMF advocates the following as being precursors to realizing the growth levels that the Region has the opportunity to achieve.

- The establishment of peace and political stability

- Continued macroeconomic stabilisation programmes that control inflation and curtail excessive budget deficits, improve the use of public resources, and reduce trade and exchange restrictions.
- Intensified programmes aimed at improving health and education.
- Improvement in the efficiency and quality of public services, reduction and control of corruption, enhancement of the protection of property rights, and improvement in the respect for and enforcement of law.
- Stimulation of the development and improvement of financial markets and institutions, resulting in liberalization of the capital account.
- Allocation of sufficient resources to the development and maintenance of adequate infrastructure.
- Reduction of the external debt burden by a programme of visible domestic effort which will encourage debt reduction.

The following table, extracted from the World Bank Atlas, 2000, summarises the position with regard to these indices for the period 1990 to 1998. It clearly illustrates the result of war and political instability on countries such as Angola and the Democratic Republic of Congo.

The debt positions should be read with the GNP for each country, illustrating in many cases that the debt level exceeds the GNP for 1998.

Table 2 Economic indicators for African countries (World Bank Atlas)

	<b>GNP \$ millions</b>	<b>GNP per capita \$</b>	<b>Average annual real growth rate</b>	<b>Investment %of GDP</b>	<b>Average annual inflation rate</b>	<b>Total external debt \$ millions</b>
			1990-1998	1998		
Angola	4578	380	-8.2	20	924.3	12173
Botswana	4795	3070	0.9	21	10.3	548
Burkino Fasso	2575	240	1.1	29	6.6	1399
Central African Republic	1053	300	-0.7	14	5.4	921
Democratic Republic of Congo	5433	110	-8.5	8	1423.1	12929
Kenya	10201	350	0	14	15.8	7010
Lesotho	1167	570	2.3	49	7.7	692
Malawi	2168	210	0.8	14	33.2	2444
Mali	2646	250	0.6	21	9.3	3202
Mozambique	3478	210	3.5	20	41.1	8208
Namibia	3217	1940	0.8	19	9.5	0
Nigeria	36373	300	0.4	20	38.7	30315
Rwanda	1864	230	-4.3	16	18.1	1226
South Africa	136868	3310	-0.1	16	10.6	24712
Swaziland	1384	1400	-0.1	12	12.4	251
Tanzania	7154	220	0.5	15	24.3	7603
Uganda	6566	310	4.3	15	15.3	3935
Zambia	3234	330	-0.9	14	63.5	6865
Zimbabwe	7214	620	-0.2	17	21.9	4716

Various external aid initiatives have been developed to address the economic situation in the region. For example the African Development Foundation (ADF) states in their 2000 performance plan “ Every significant socio-economic indicator shows that the welfare of the people of Africa (as a whole) is still significantly worse than every other region. It is estimated that close to 40 percent of Africans live on less than the equivalent of one US dollar per day”.

Development grants have been based on the following objectives:

- Promoting micro and small enterprise development that will generate income and employment
- Improving community based natural resource management for sustainable rural development
- Increasing participation of African grassroots enterprises and producer groups in trade and investment relationships with the US and within Africa
- Strengthening civil society and local governance
- Encouraging African governments to expand grassroots participation in policy making and resource allocation processes.

Such aid programmes support the notions put forward by the IMF, of stimulating growth through internal and regional intervention.

### **Key issues.**

From this discussion, some encouraging trends are emerging in growth, especially where there have been shifts away from resource based economies, where a resource based economy is defined as one with a contribution of resource based industries to GDP of more than 8%.

However, most countries remain hindered in terms of investment and growth by instability and conflict, coupled with investor-unfriendly policies, and a lack of regional integration.

## ***2.0. Mining in the SADC Region***

Mining continues to be the mainstay of most economies of the SADC region and represents the major source of foreign currency revenue.

Indeed, an average of 60 percent of foreign exchange earnings are derived from the minerals industry, representing some 10 percent of gross domestic product, and providing 5 percent of the employment base of the economy of the SADC region (in the formal sector).

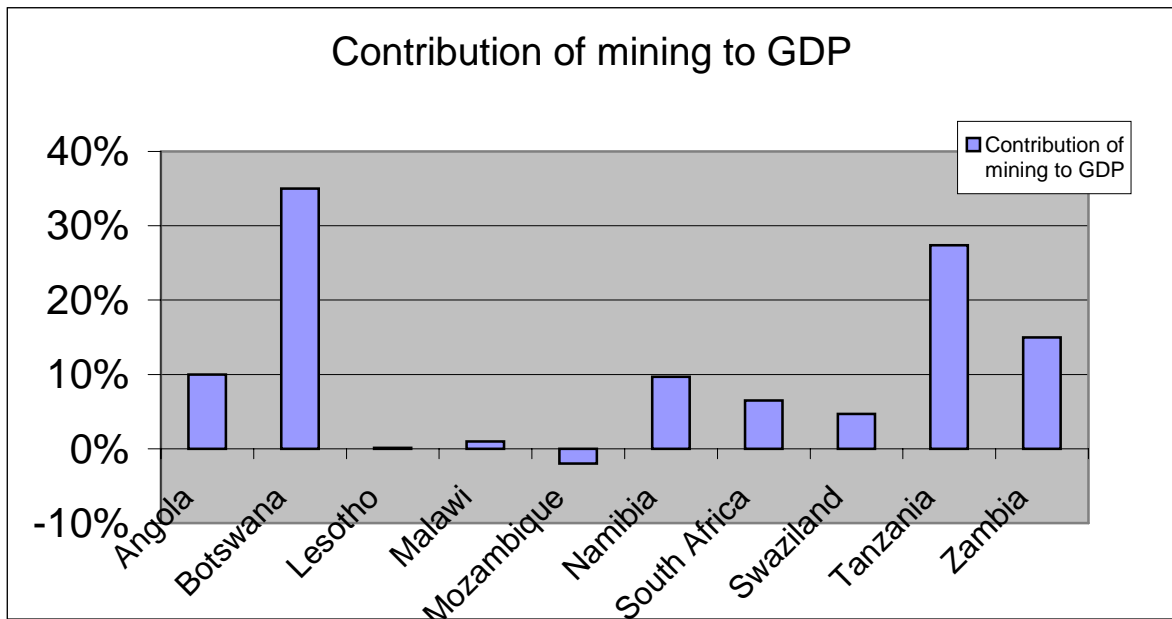


Figure 2 Contribution of mining to GDP, selected countries.

During the past decade, a number of countries made efforts to reform their policies and the regulatory environment, aimed at encouraging private sector participation, attracting new capital investments, technology and skills and stimulating exploration.

In addition, the global technological advances and cost competitiveness in minerals production developments, the globalization of finance and investment and the global competition for investment resources, led to most countries choosing more liberal policies.

For example, Botswana's Parliament passed a new Mines and Minerals Act after an extensive period of consultation and study of more modern legislation operation in other countries. The aim of the new legislation, coupled with revisions to taxation policy, is to provide an economic environment which is favourable for investment in the minerals industry of the country, and which allows companies to be globally competitive.

South Africa, on the other hand, has recently introduced the Draft Mineral Development Bill, following on several years of consultation and public advocacy.

The intent of the draft Bill has been to stimulate the minerals industry through the transfer of mineral rights to the State, thus allowing free access to rights and information, and through the encouragement of investment in beneficiation.

Much debate has centred on the issue of security of tenure of mineral rights and property, and some of these issues are still under discussion.

Objections from the Chamber of Mines have been founded on the fear that possible expropriation of mineral rights by the State, or the imposition of penalties and levies, could in fact discourage investment, because of increased hurdle rates and higher risk, as perceived by the potential investor.

Nevertheless, agreement was reached between the Government and the Chamber of Mines, on issues of security of tenure, the need to attract foreign investors, and on transitional mechanisms, after it was agreed that objective criteria will be stipulated for the Minister to follow, in allowing or refusing to grant a mining licence.

The parties further agreed to promote black empowerment, and illustrated this commitment through the establishment of a \$100 million fund to support small mining companies, and help finance acquisitions (Financial Times, 12 June 2001).

Proposals for a revised and consolidated fiscal framework for mining in Zimbabwe have been presented to its Cabinet Committee on Investment. Most of the issues in the proposals were agreed and included in the 2001 Budget presented to Parliament. The proposals aim to ensure that the mining investment regime in Zimbabwe maintains its competitiveness for mining capital and that Government gets a share of mine-life profits.

However, current developments in that country in terms of political and economic instability, and a slide into severe recession do not bode well for the successful implementation of these policies, and the attracting of foreign capital.

The Department of Mines and Energy in Namibia recently launched its strategic plan for the Minerals industry, for 1999-2003.

The plan builds on the foundations laid since independence, which concentrated on establishing a self sufficient energy sector, and encouraging investment in the minerals industry.

- The plan is based on the following objectives:



- To promote investment in the minerals and energy sectors
- To ensure the sustainable contribution of resources to the socio-economic development of Namibia
- To create a conducive environment for the mineral and energy sectors
- To regulate and monitor the exploration and exploitation of mineral and energy resources
- To minimise the impact of exploitation of mineral and energy resources on the environment
- To provide a professional and customer focussed service.

Specifically, the plan aims to stimulate growth in the mining sector by 2-3% in real terms per year, through:

1. Creating an enabling environment that will be competitive and conducive to promoting investment
2. Promoting the development of a vibrant and sustainable small mining sector
3. Ensuring that mineral resources are exploited in a safe, responsible and sustainable manner
4. Promoting the integration of the mining with other sectors.

Namibia recognises through this plan, the need to attract foreign investment, in a competitive market. The plan recognises the potential for investment in Africa, and wishes to ensure that its legal, fiscal and economic environment is conducive to attracting its fair share of this investment. To this end, the Government is increasing its expenditure significantly, to support private and foreign investment, as shown below.

Figure 3 Expenditure by Namibia on the minerals industry 1999-2002

<b>Allocated expenditure levels for mining</b>			
	<b>1999/00</b>	<b>2000/01</b>	<b>2001/02</b>
	1305000	1435500	1579100
Current expenditure	0	0	0
Capital expenditure	2000000	3000000	3300000
<b>Allocated expenditure levels for geological survey</b>			
		1035500	1139100
<b>Current expenditure</b>	9413000	0	0
Capital expenditure	4218000	3932000	4325000
<b>Allocated expenditure levels for energy</b>			
Current expenditure	5682000	6251000	6876000
Capital expenditure	3038600	5596900	6156600
	0	0	0

Expenditure in the geological survey is aimed at providing information for potential investors, in order to stimulate the industry. A glance at the table of economic indicators (table 2 ) shows that economic stability, relative to other countries, allows such investment based expenditure, as opposed to expenditure on military or debt repayment.

At regional level, efforts have been made in promoting investment in the minerals industry of Southern Africa .The step towards this goal was the mining investment forum held in Lusaka in October 2000. The event brought together project promoters with investors and potential investors from the SADC region, Europe and North America.

## **2.1 Mining Investments**

The SADC region remains a major producer of metals and minerals. This equates to approximately 46% of vanadium, 72% of platinum group metals, 40 percent of chromite, 26 percent of gold, 55% of diamonds and 20% of cobalt. It is also a major supplier of manganese, and supplies some 8 % of copper.

The extent of the region's mineral resource base is indicated in the table below.

The potential of the minerals industry to contribute to the regional economy, given the extent of resources as illustrated in table 3, has not been fully realised due to a number of constraints, including:

- Dependence on imported inputs in exploration, production and processing activities in most SADC states
- Scarcity of foreign exchange for the procurement of essential inputs and spares
- Poor dissemination of information on the potential and mineral resources of the region
- Insufficient support by governments to facilitate geological research
- Lack of skilled human resources to fulfil the sector requirements
- Technological dependence on industrialised countries by most member states
- Unattractive investment climates
- Lack of integration of the mining industry in the regional economy.

Realising these constraints, the Southern African Development Community developed a strategy document for the years 1992-1996, to address these issues.

This document highlighted the following strategies to be adopted:

- Information dissemination on the investment climate and business opportunities available in the region
- Strengthening National/Regional institutions involved in mineral exploration and development
- Encouraging downstream processing of minerals
- Compiling data on potential mining projects
- Identifying potential commodities for exploration
- Encouraging publications on geological information
- Reducing the adverse environmental impact of mining
- Ensuring training and sustainability of human resources.

Table 3 Resources in the SADC region (1993)

<b>Mineral</b>	<b>Unit</b>	<b>World</b>	<b>SADC</b>	<b>%SADC</b>
Chromite	Mt	4446	4130	92.9
Gold	tonnes	46000	24500	53
PGMs	tonnes	67041	58900	87.9
Nickel	Mt	123	12.8	10.4
Copper	Mt	595	47	7.9
Antimony	Kt	4690	250	5.3
Phosphate	Mt	33710	3440	10.2
Iron ore	Mt	101100	5900	5.2
Coal	Mt	525500	60000	11.5
Uranium	Kt	2320	290	12.5
Cobalt	Kt	8800	555	6.3
Managanese	Mt	4796	3992	83.2

*Source : SADC Mining Sector five year strategy*

Despite various problems with regard to funding, progress was made in a number of areas, including the strengthening of national and regional institutions involved in geological studies, identifying potential commodities for exploration and

development, to take advantage of opportunities arising in the market, investment promotion through various forums and initiatives, technology transfer to the small mining sector especially in the area of mineral processing, studies on aspects relating to the protection of the environment, and work on the creation of regional databases and publications.

However, the limited extent of progress indicated the need for a review of the process, with the resultant development of a new set of strategies and objectives for 1997-2001. These objectives are:

- To foster economic integration of the region
- To promote investment into and development of the mining sector
- To integrate mining into the economies of the region
- To maximise benefits from mining
- To promote sustainable and environmentally friendly mining industry.

Strategies have been developed dealing with establishing regional geological databases, marketing of mining as an attractive investment option, encouraging the small scale mining sector, encouraging investment in the minerals processing and beneficiation areas, developing human resource development through regional cooperation, establishing regional protocols for the protection of the environment, and sharing of information.

The result of this work has been the establishment of an SADC Mining Sector Protocol, to which the governments of Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe have committed themselves.

Principles embodied include that member states:

1. Recognise that a thriving mining sector can contribute to economic development, alleviation of poverty and the improvement of the standard and quality of life throughout the region.
2. Shall seek to harmonise national and regional policies, strategies and programmes related to the development and exploitation of mineral resources
3. Agree to bear their own costs of participation in institutional mechanisms for the effective implementation of this protocol except that the Mining

Coordinating Unit administrative cost shall be borne by the hosting member state

4. Agree to decide all matters related to the implementation of the protocol by consensus.
5. Agree to cooperate in facilitating the development of human and technological capacity.
6. Shall encourage the development, transfer and mastery of science and technology throughout the region.
7. Shall encourage private sector participation in the exploitation of mineral resources.
8. Shall promote economic empowerment of the historically disadvantaged in the mining sector.
9. Agree that their governments and the SADC shall improve the availability of public information to the private sector, member states and other countries.
10. Undertake to jointly develop and observe internationally accepted standards of health, mining safety and environmental protection.

Broad alignment occurs between these principles and the pre-requisites identified by the IFC and the World Bank, to ensure a favourable investment climate, as underpinned by the economic indicators that have been referred to above.

Clearly, however, war torn countries which have significant potential mineral wealth, are not included in this picture. Indeed, until their political and economic regimes are stable and relatively risk free, they will continue to be excluded from various regional initiatives which rely on such stability.

Investment in mineral projects, as in any project, is based on the balance of the risk and the appropriate reward, as perceived by the potential investor.

Should risks be perceived as being high, the investor will simply invest elsewhere.

Mining ventures carry an abnormally high level of risk, relative to other sectors, as a result of a combination of financial, technical, geographical, political and environmental risks. Positive initiatives to alleviate these risks on a regional level are therefore important instruments in attracting investment into mining in developing countries, especially those endowed with mineral wealth, reasonable infrastructure and access to world markets.

The various efforts and initiatives outlined above, coupled with economic and political stability in many countries, has resulted in significant investment in the minerals industry in Southern Africa. This is exemplified by statistics from the IFC, in terms of loan capital funding to the minerals industry, relative to other industries.

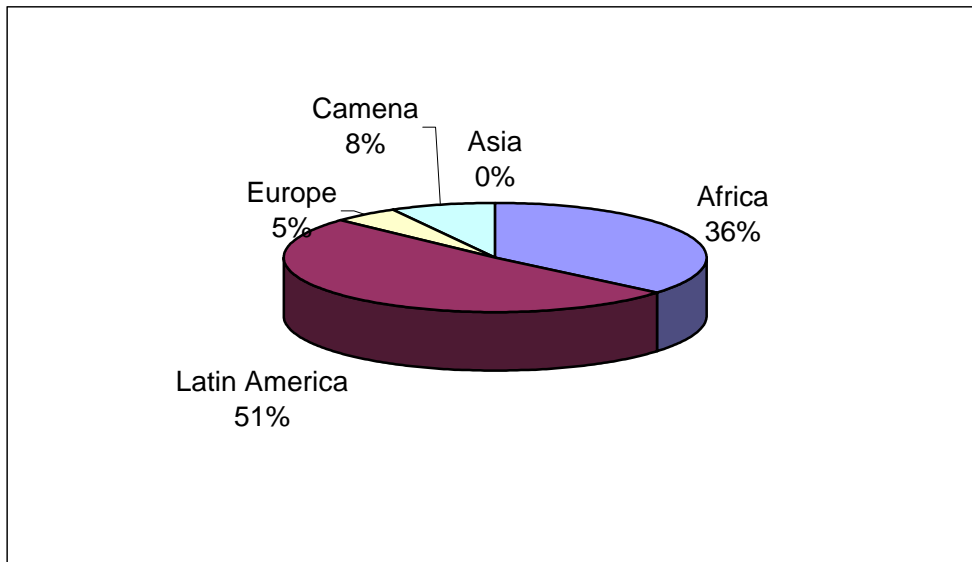


Figure 4. Distribution of IFC loan funds to mining.

Source: International Finance Corporation

Figure 4 for example, shows the distribution of \$620 million of loan funds supplied by the IFC in 1999, per region, with Africa attracting 36%.

Figure 5 below shows the distribution of these funds per mineral commodity in 1999.

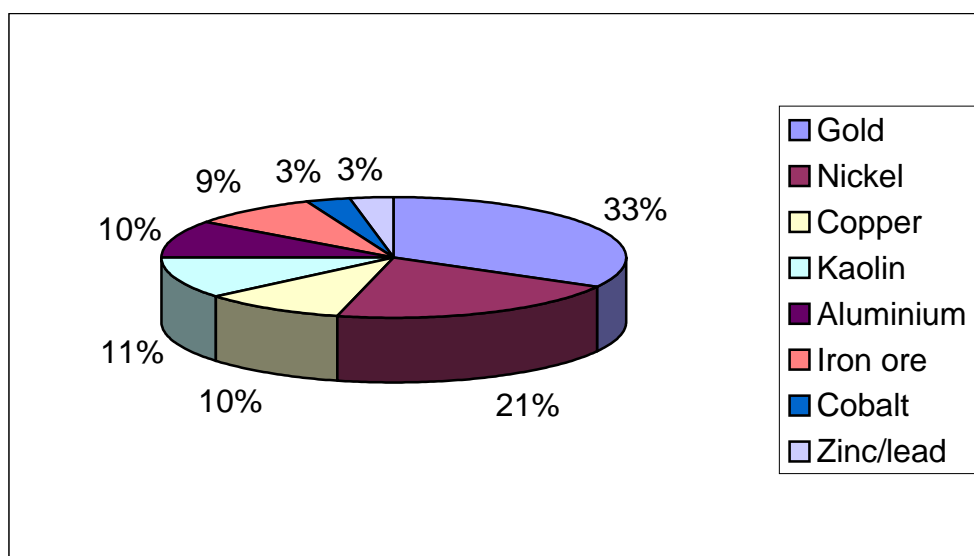


Figure 5. Distribution of IFC loan funds by mineral, 1999.

Source: International Finance Corporation

Furthermore recent developments have shown a number of large capital investments, as shown in the table below, which illustrates large greenfields projects currently under construction (table 4).

Project	Mineral	Value of investment	Country	Company
		\$ millions		
Bulyanhulu	Gold	280	Tanzania	Barrick
IHM heavy minerals	Heavy metals	230	S Africa	Isacor
Maandagshoek	PGMs	160	S Africa	Aplats/ARM
Skorpion	Zinc	454	Namibia	AAPIC
Target	Gold	260	S Africa	Avgold
Winaarshoek	PGMs	200	S Africa	Impala

Table 4. Major greenfields projects in Southern Africa. Source: Mining Weekly

These greenfields projects are in addition to expansion or brownfields projects currently underway.

Investment programmes continued to be initiated by several mining houses in the region. Chibuluma Mines Plc, a subsidiary of Metorex Limited of South Africa, commenced the development of a new mine at Chibuluma South, from 1997, which was officially opened in May 2001. The total investment is approximately US\$34 million which will be spent over a period of three years. The mine has a planned capacity of 17,000 tonnes of copper per annum when it becomes operational in 2001. Non-Ferrous Corporation

Africa Mining Plc of China initiated work on the rehabilitation and development of Chambeshi Mine. The mine will initially produce 45,000 tonnes of copper per year commencing towards the end of 2001, and will provide employment for 338 people when the underground operation is in full production.



Metorex was one of the first entrants to the copper belt after privatisation, and have had protracted negotiations to ensure favourable conditions for investment, in terms of royalties, electricity tariffs, tax rates and customs duties.

In Namibia, construction of the Skorpion zinc project whose capital cost is US\$ 454 million is underway, with first production expected in the second quarter of 2003. Planned production is 150,000 tonnes per annum for a period of at least 15 years. The project which is wholly-owned by Anglo-American Plc was approved by the Board during the year. Skorpion is planned to be one of the lowest-cost producers of zinc in the world. Project development is a joint venture project formed between Bateman Project Holdings Limited and SNC-Lavalin Inc.

The project, when in operation, will contribute 4% to the GDP of Namibia, and provide employment for 2000 people in the construction phase, and 550 during the production phase. Interestingly, it will feed concentrate to the new Zincor smelter, which will serve Southern African interests for zinc refining, thus providing regional beneficiation capability.

Rosh Pinah zinc Company has invested approximately US\$ 4 million (N\$ 32 million) in the expansion of its ore production capacity while Rossing Uranium Ltd commenced the construction of a pilot ore sorting plant at an estimated cost of US\$5.8 million (N\$47 million).

On 13<sup>th</sup> March, 2000, Ongopolo Mining and Processing Limited acquired assets from Tsumeb Corporation Mines resulting in an increase in copper production by the end of 2001.

The Mozambique Aluminium Smelter Project (MOZAL) whose total investment is US\$ 1.3 billion, with shareholders Billiton Industrial Development Corporation of South Africa, Mitsubishi (Japan) and the Mozambican Government, poured its first metal in June 2000. Production was six months ahead of schedule and below budget. Recently, go ahead was given to increase capacity, and aluminium will be sent to the new Hulett rolling facility in Natal, for beneficiation.

A US\$13.36 (Z\$ 580 m) evaluation of three kimberlite deposits for economic viability in Zimbabwe by Rio Tinto is encouraging. The Murowa Mine will commence full operation in the next fifteen months. Also, the Sino-Zimbabwe Cement Project with an investment of approximately US\$69.09 m (Z\$3000m) opened in Gweru District. Expected production is 900 tonnes of cement daily.

The Ngezi platinum operation, on the Great Dyke, is a \$47.5 million potential investment, to be operated by Zimplats. The mine will utilise the Selous (Hartley) metallurgical complex to process the ore, under the terms of a favourable agreement for its purchase, facilitated by the Zimbabwean Government.

Several developments have occurred in Tanzania with a number of gold companies committed to major expenditures on the development of new mines. Ashanti Goldfields Ltd in a joint venture with Anglo Gold commenced work on the development of a new gold mine in Geita district in June, 2000. Total investment in the projects is US\$ 265 million and expected production per annum is 500,000 ounces. In another move, Afrika Mashariki Gold Mines whose estimated resources at its gold mine is 2,000,000 ounces envisages starting production. The company will spend US\$80 million on the project and its planned annual output is estimated at 200,000 ounces. In addition, Kahama Mining Corporation expects to start production of its Bulyanhulu gold mine in the second quarter of 2001. The development commitment of the project is US\$350 million with expected annual production at 400,000 ounces. This mine has more than 10,400,000 million ounces of proven gold.

In Botswana, the approximately US\$274,698.82 million Orapa expansion project which has doubled its annual production to 12 million carats, was officially opened in May, 2000.

According to the latest edition of the South African Mineral Industry, published by the Department of Minerals and Energy, investments of US\$3,326 million have already been committed to mineral related projects during the review period. Gold and platinum account for 54 per cent (US\$1,442 million) and 31 per cent (US\$819 million) respectively, of all primary minerals.

During 2000, AngloGold invested US\$205 million to acquire a 50 per cent interest in Ashanti Goldfield's Geita project in Tanzania.

In South Africa, AngloGold maintained its commitment of capital to the Moab Mine development, which has an invested capital amount of some R4 billion.

Harmony Gold Mining company acquired Randfontein Estates at a cost of US\$103.38 million (R827 million), and also acquired the Elandsrand and Deelkraal mines, previously operated by AngloGold.

This change of ownership is significant in that it illustrates an aspect of sustainability, in that unprofitable mines may be turned to profitability by change of ownership to companies with different operating profiles and structures.

Anglo Base Metals is to invest US\$110 million in the development of extensions to Black Mountain in the Northern Cape, and work is underway on the feasibility of the Gamsberg Zinc operation. Plans were announced after a feasibility study conducted between November 1999 and November, 2000.

Progress continued on the Dwaarsrivier project, as well as the Kroonbaar platinum operation in South Africa, where a further R190 million has been earmarked for expansion.

All platinum producers are in the expansion phase, with platinum production from South Africa set to increase beyond its current 72% of the world market.

Anglo Platinum has recently announced a R5 billion per year expansion programme, while Impala is set to spend R1 billion per year for the next five years.

Expansion is underway at Premier Diamond mine, through the deepening project which will significantly increase the life of this operation, as a result of a R100million investment..

Southern Era recently announced plans for the establishment of a new diamond mine in Angola, which is a joint venture between several global companies and the Angolan Government, will provide employment for some 350 people.

Southern Era has also recently accessed finance of R50 million for the new Klipspringer project.

Anglo American Plc, through its subsidiary Zambia Copper Investments Plc (ZCI), of which it owns 51%, is proceeding with its \$230 million refurbishment and upgrading of the Nchanga and Konkola operations.

The privatization process began in 1991, but after long and difficult political and financial negotiations, the first bids were only placed in 1997, with final sale in March 2000 to a joint consortium of ZCI,ZCCM, the IFC and the CDC.

The go-ahead for a \$1 billion [project at Konkola Deep is expected soon, pending necessary permissions from the Zambian government and the IFC..

These examples illustrate continued investment in a diverse range of minerals and countries. They also show that:

- Investment based on risk/reward ratios favours economically stable countries, where favourable investment climates have been established
- Risk is increasingly shared through joint venture arrangements
- Spreading of technical risk through increasing levels of outsourcing of technical expertise.
- Financing is increasingly arranged through debt funding
- Globalisation has resulted in major companies diversifying their risk geographically on the one hand, while establishing value added products which satisfy global demands, whilst paying heed to socio economic and socio political issues such as black empowerment, environmental protection, community development issues etc..

However, investment potential remains hampered by:

- High costs of capital relative to other parts of the world, as shown in figure 6 , which compares South Africa to the rest of the world

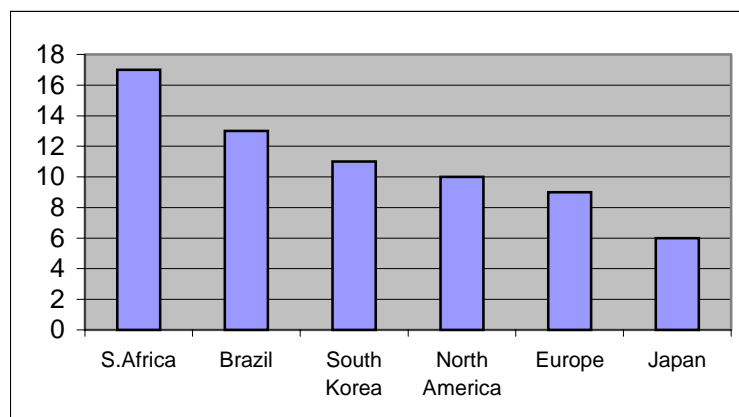


Figure 6. Cost of capital, South Africa against selected countries.

*Source: Chamber of Mines Economic Services*

- High or unfavourable rates of corporate taxation, which itself is a driver of the cost of capital
- The paucity of skills to sustain higher growth rates
- High levels of state involvement in economies (which distort input costs, undermine competition and shorten planning horizons)
- Political instability in certain countries.
- Perceived risks for investors of expropriation, unstable economic conditions etc.
- Stringent exchange controls in certain countries, which prevent the outflow of capital, and impose restrictions on the import of capital equipment.
- Instability in interest rates.

Key issues highlighted by this review are that major investments are continuing if not increasing in the Minerals industry of the SADC region. Predominantly, these are in the primary sector, although there are noteworthy beneficiation projects also underway.

Often, these investments are still hampered by protracted negotiations with governments, either in terms of joint venture arrangements, or as providers of licenses and permissions, or investment conditions such as taxation, exchange control arrangements and import duties.

Whilst multinational companies have the financial leverage to enter into these arrangements, often facilitated by the IFC, smaller operators and entrepreneurs may find it difficult, until the intent of enabling policy is a reality.

Below (table 5) is a summary of large investment projects for the year 2000.

**Table 5: Mineral Investment Projects in the SADC Mining Industry, 2000**

Country	Company	Mineral	Cost US\$M (Unless otherwise specified)	Planned output per annum	Date of commencement and/or status

Botswana	Debswana Diamond Co. (Orapa Expansion Project)	Diamonds	275 <sup>+</sup>	12 m carats	in operation
	Debswana Diamond Co. (Jwaneng Aquarium Project)	Diamonds	76 <sup>+</sup>	-	-
Zimbabwe	Zimplats & BHP Minerals	Platinum	69.09*	2.2 m tonnes	2 <sup>nd</sup> quarter of 2001
	Rio Tinto	Diamonds	13.36*	-	2002
	Sino-Zimbabwe Cement Project	Cement	69.09*	900 tonnes	In operation
Tanzania	Ashanti Goldfields Ltd and AngloGold	Gold	165	500,000 ozt	June, 200
	Kahama Mining Corporation	Gold	350	400,000 ozt	2 <sup>nd</sup> quarter of 2001
	Africa Masharki Gold Mines	Gold	80	200,000 ozt	Late 2001
Mozambique	Billiton (Mozal Project)	Aluminium	1.3 billion	250 kt	In operation
Zambia	Chambishi Metals Plc	Cobalt Copper	130	4,200 (Cu) 6,000 (Co)	-
	Chibuluma Mines Plc	Copper	34	480,000 tonnes	May , 2001
	Non-Ferrous Corporation Africa Mining Plc	Copper	150	-	February, 2001

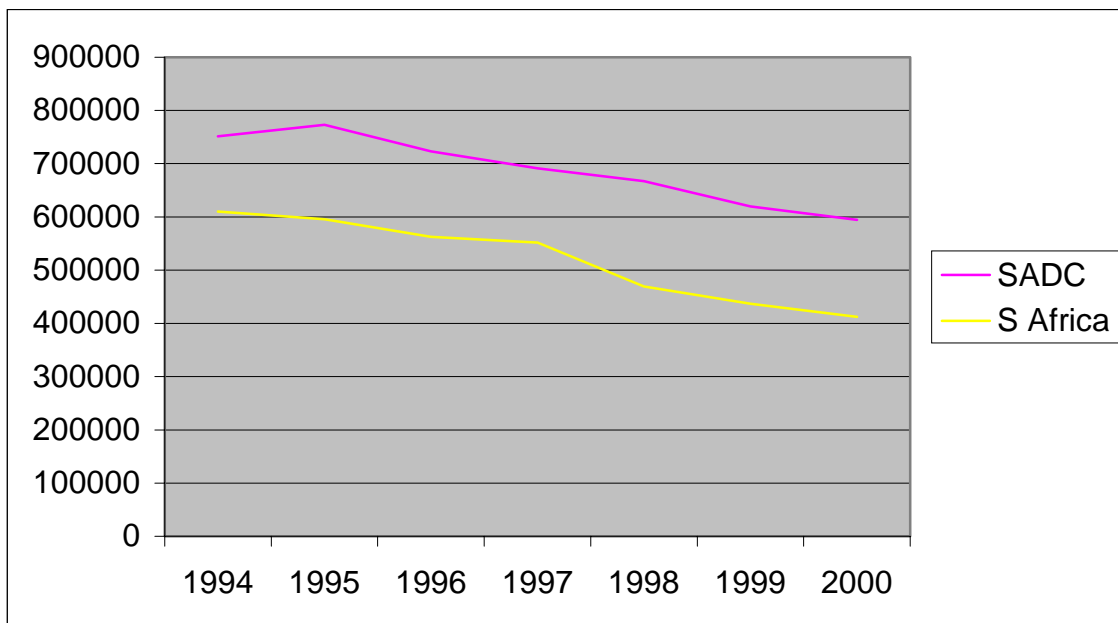
	Konkola Copper Mines	Copper	523	160,000 tonnes	-
Namibia	Anglo American Plc Bateman & SNC- Lavalin (Skorpion Zinc Project)	Zinc	450	150,000 tonnes	1 <sup>st</sup> quarters, 2003
	Rossing Uranium Ltd	Uranium	5.8	-	Construction of ore sorting plant
	Rosh Pinah Zinc Co.	Zinc	4	-	Expansion of ore production capacity
Malawi	Paladin	Uranium	60	-	-
South Africa	Various Companies	primary minerals, gold, platinum, processed minerals, other	3,326	-	-

**Note:** + at a Pula/dollar exchange rate of 4.7281 (February, 2000)

\* At a Zim\$/dollar exchange rate of 43.4197

## **2.2 Employment in the SADC Mining Industry**

During the period 1994 to 2000, the total labour force in the SADC Mining Industry dropped from 751115 to 594637.



**Figure 7 : Employment in mining. Source : SADC Member States**

Figure 7 illustrates the numbers, which appear in table 6, with respect to the SADC (excluding the DRC), and show the influence of the decline in employment in South Africa, as a result of cut backs in the gold sector principally.

The numbers from a number of countries are estimates at best, especially if the informal sector is taken into account.

The number of people employed in the South African industry declined by nearly 200,000, which affects some 1.6 million people when one takes dependency into account. Clearly many of these people are migrant workers, whose loss of employment will have economic effects in the countries from which they come, principally South Africa, Lesotho and Mozambique.

Figure 8 below shows the distribution of these people in terms of full time employees and contractors, by gender, in South Africa.



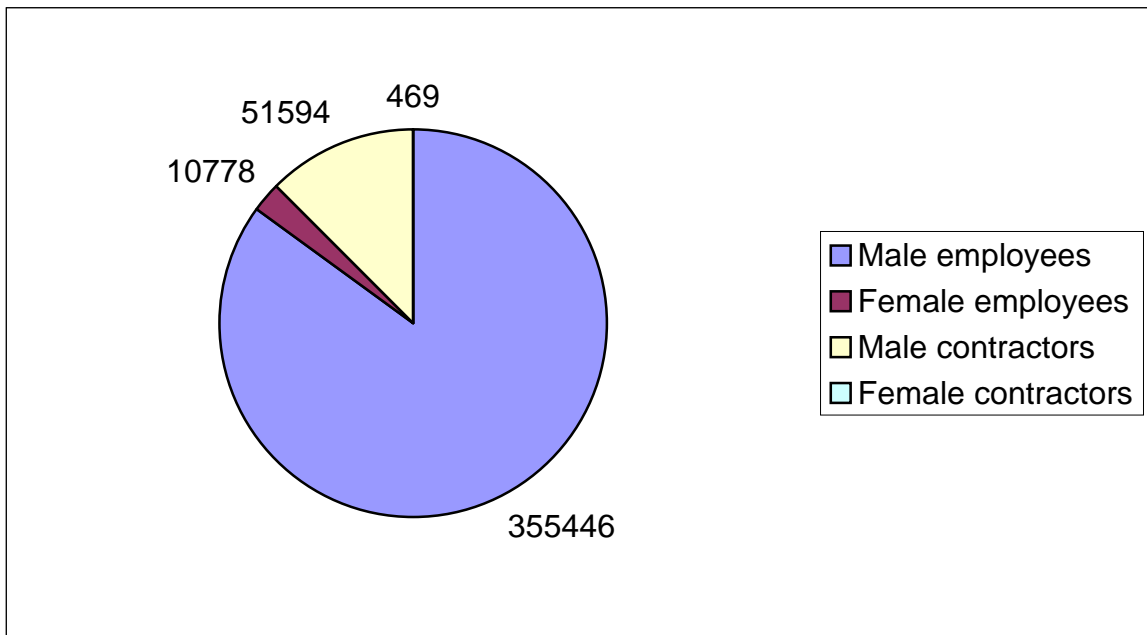


Figure 8 : Employment statistics, South Africa 2000. *Source : DME.*

One would expect this distribution to change, especially with regard to an increase in contractors, with the current trend towards outsourcing.

Within South Africa, employers are obliged, through the provisions of the Minerals Policy and the Skills Development Bill to pay a levy towards training, with the intent of providing skills to workers which can be used in the event of redundancy.

Unfortunately, the imposition of the levy has had the effect in some cases of the employer taking the stance that in paying the levy, he has fulfilled his statutory obligation, with the result that voluntary skills development programmes have been lost.

This is an unfortunate consequence of an imposed system, as opposed to an incentivised system of voluntary corporate citizenship.

In Angola the number of persons employed in the sector remained static at 24,000, while Botswana's labour force in the mining industry decreased from 14,345 in 1999 to 12961 in 2000. The decrease was a result of completion of two major projects ie Debswana's Orapa Expansion Project and Jwaneng Aquarium Project which had employed a number of expatriates.

Namibia's employment figure rose from 5,427 in 1999 to 6,248 persons in 2000. The Resuscitation of the old Tsumeb corporation mines by Ongopolo Mining and Processing Limited contributed to the increase in employment in the previous year. Meanwhile South Africa's average number of workers employed in its mining sector continued to decrease due to amongst others, the shrinking gold sector and improvements in productivity in the domestic minerals sector. However, despite the gold mining industry's declining economic contribution it continues to be the major employer followed by the PGM's industry.

The commencement of mining activities at the Golden Pride Mine in Ngeze district; Ashanti Goldfield's Geita gold Mines, and Barrick's Bulyanhulu Gold Mine contributed to the increase in the labour force in Tanzania's mining industry. Employment levels rose from 1,000,000 in 1999 to 1,500,000\* persons in 2000. This large increase was in part attributed to estimates of employment in the informal sector, which should be taken with some circumspection.

In fact, in all cases, employment estimates for the informal sector are very rough estimates.

A number of companies and governments have developed initiatives to legitimize mining in the informal sector, especially in the area of artisanal mining.

Clearly, further development of the small mining sector, as stated in various policy documents and reviews extends the legitimacy into the area of authorization and licenses.

Despite the downward trends indicated by the numbers illustrated here, there are promising signs of recovery, in terms of:

- Expansions in the zinc industry
- Developments in the copper belt
- Expansion in the PGMs sector
- Downstream beneficiation initiatives
- Expansion in the aluminium industry
- New projects in the gold sector
- Stability in Angola and DRC, with the potential for opening up large minerals projects.

**Table 6: Employment in the SADC Mining Industry 1994-2000**

Country/Year	1994	1995	1996	1997	1998	1999	2000
Angola	23638	24692	24220	25680	25215	24000	24,000
Botswana	13272	12779	13024	13055	15255	14345	12,961
Democratic Republic of Congo	.....	-	-	-	-	-	-
Lesotho	-	-	-	-	550	550	636
Malawi	-	-	-	-	2700	3700	3700
Mozambique	974	1032	929	872	872	872	872
Namibia	9693	9775	8540	8214	7686 <sup>(</sup>	5427	6,248
South Africa	610294	595384	562249	551677	469045	436702	412,000
Swaziland	1373	1301	1417	1220	1220	1220	1220
Tanzania	-	-	-	-	60000*	60000	60000
Zambia	47036	45461	42522	37150	36065	25000	25000
Zimbabwe	44835	82846	70087	53432	48449	48091	48000
<b>TOTAL</b>	<b>751115</b>	<b>773270</b>	<b>722988</b>	<b>691300</b>	<b>667107</b>	<b>619887</b>	<b>594637</b>

**Source: SADC Member States**

\* Includes informal sector

### **3.0 PERFORMANCE OF MAJOR MINERALS**

This part of the review looks at the performance of major minerals.

#### **3.1 Asbestos**

Despite the continued declining trend of world asbestos production due to calls for its banishment, the SADC region recorded an increase in output. Total production increased from 129,584 tonnes in 1999 to 183,544 tonnes in 2000. Most of the production occurred in Zimbabwe which accounted for 82.79 per cent of total output while South Africa and Swaziland contributed 10.3 per cent and 6.91 per cent respectively.

Swaziland's output declined from 22,912 in 1999 to 12,690 tonnes in the year 2000. The deep in production is largely attributed to depleting ore reserves at Bulembu asbestos mine. On the other hand, South Africa's production remained relatively stable at 18,900 tonnes from 18,800 in 1999. This static production was mainly due to the continuing declining demand resulting from the health risks associated with the use of asbestos, fibres and dust.

The price of asbestos will continue to remain under pressure due to oversupply and shrinking global demand.

Table 7 : Asbestos production, 1994-2000.

<b>COUNTRY</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
South Africa	92,130	88,642	56,900	50,104	27,752	18,800	18,900
Swaziland	28,591	28,591	26,014	25,888	27,693	22,912	12,690
Zimbabwe	151,905	169,487	165,494	160,500	123,295	87,872	151,954
<b>Total</b>	<b>272,626</b>	<b>286,720</b>	<b>248,408</b>	<b>236,492</b>	<b>178,740</b>	<b>129,584</b>	<b>183,544</b>

### 3.2 Coal

Regional production of coal marginally declined from 229,905,601 in 1999 to 228,329,564 tonnes in 2000. South Africa is currently the region's major producer of coal followed by Zimbabwe and Botswana.

Total coal output in South Africa amounted to 222,890,000 tonnes in the year 2000 compared to 223,300,000 tonnes in 1999. This slight decline, amongst others, was caused by a marginal decrease in the growth of local electricity generated, hence decreased coal consumption by Eskom.

However, as shown in table 8, there has been a steady increase in South African coal production to current levels.

South African coal is exported principally to Europe and the Far East, through Richards Bay. The demand for South African steam coal remains high, with threat for South Africa being depletion of reserves.

To this end, the collaborative CoalTech 2020 project has aimed its focus on the sustainability of the industry, through the application of technology to enable lower grade and quality coal deposits to be mined in the future.

Meanwhile, several new developments have occurred in South Africa's local and global coal industry. In order to enhance their global supply strategy, in September 2000, Billiton, Anglo American and Glencore bought Carbores del Corregon in Columbia. The same consortium has also bought a 50 per cent share of a large coal block in Columbia which produces at around 18 million tonnes a year. Moreover, overseas companies have expressed and renewed their interest in investing in the country's coal mines.

Botswana's coal output in 2000 stood at 946,898 tonnes in 2000 compared to 945,316 tonnes in 1999. Zimbabwe and Swaziland registered declines in coal production in 2000, which were 3,986,202 tonnes and 378,043 tonnes respectively.

In 2000 coal prices rose substantially to approximately US\$ 30/ta due to supply-side disruptions of such as political and social instability in Indonesia and fires at the Los Angeles coal terminal. Prices in Asia are said to be rising above US\$33/t.

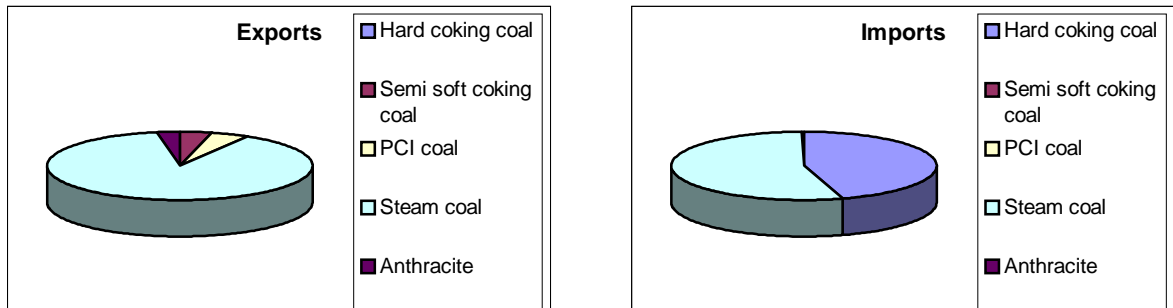


Figure 9 Exports and imports of African coal. *Source:Coal Services International*

Figure 9 shows the export and import activity of coal in Africa as a whole, by category. Figure 10 shows this in terms of the balance of exports and imports, and illustrates high levels of exports compared with imports, driven by the export of steam coal.

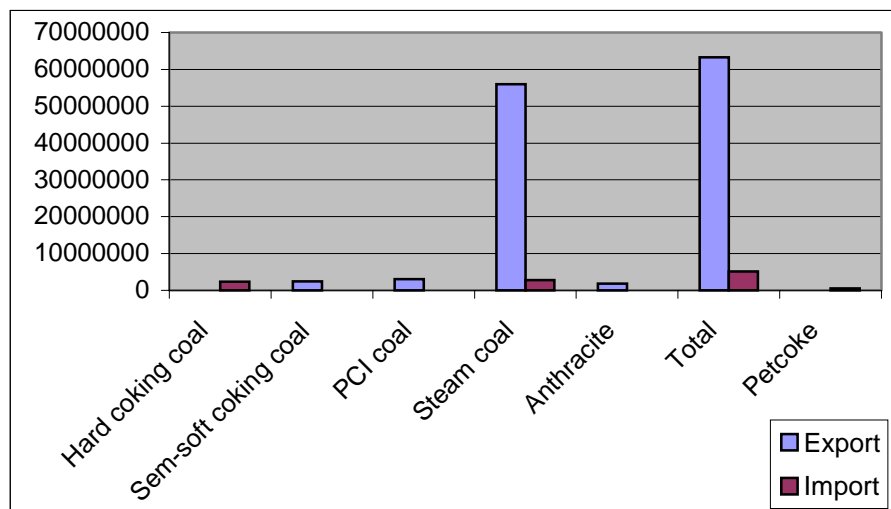


Figure 8 . Value of exports and imports of African coal. *Source: Coal Services International.*

While the coal market and production levels remain reasonable static, there are indications of an undersupply situation developing now ((World Coal supply and demand report, March 2001), due to increased demand in Korea, and the steel sector, and reduced supply from China.

Table 8 . SADC Coal production 1994-2000.

COUNTRY	1994	1995	1996	1997	1998	1999	2000
Botswana	900,298	898,383	763,240		928,100	945,316	946,898
Democratic Republic of Congo (DRC)				776,917			
Malawi	34,630	14,635	50,000	36,560	54,323	43,831	
Mozambique	0	0	0	0	0	8,573	
South Africa	196,454,000	205,639,000	204,996,000	219,269,000	223,903,000	223,300,000	222,890,000
Swaziland	227,730	171,666	128,973	203,115	410,021	426,229	378,043
Tanzania	45,027	43,200	52,000	28,448	0	76,443	
Zambia	162,899	151,874	128,063	164,443	193,960	127,854	
Zimbabwe	5,515,336	4,743,480	4,757,707	4,749,790	5,066,977	4,977,355	3,986,202
<b>Total</b>	<b>203,339,920</b>	<b>211,662,238</b>	<b>210,875,983</b>	<b>225,228,273</b>	<b>230,556,381</b>	<b>229,905,601</b>	<b>228,201,143</b>

### 3.3 Cobalt

Total production of cobalt decreased by 14 percent in 2000 to 4,335 tonnes. Zambia accounted for most of the production (3,539 tonnes) followed by South Africa (397 tonnes), Botswana (320 tonnes) and Zimbabwe at 79 tonnes.

Cobalt production in Zambia declined in 2000 compared to the 1999 output. Low metal production was mainly due to continuing production constraints arising from many years of lack of investment and maintenance. Industrial and labour unrest also contributed to the declined production. However, with the completion of privatisation of the remaining assets of ZCCM, improved cobalt production is expected. Chambishi Metals Plc (Avmin, South Africa) constructed a new plant at a cost of US\$130 million to treat the Nkana Slag dump for the recovery of cobalt and copper. The plant is expected to produce 4,200 tonnes of cobalt and 6,000 tonnes

of copper per annum. An additional 6,000 tonnes of cobalt per annum is also expected from the expansion of its existing cobalt and acid plants.

In Botswana, cobalt output decrease from 332 tonnes to 320 tonnes in 2000 while Zimbabwe's output declined further to 79 tonnes.

The price of cobalt increased in 2000 compared to 1999. Low grade metal traded at an average price of US\$13.66 per pound in 2000 compared to US\$13.20 per pound in 1999.

Prices of cobalt were pushed up mainly due to strong demand from Europe and Asia combined with a drop in supply of material from the traditionally dominant producers in the Democratic Republic of Congo (DRC) and Zambia. Production from these areas is set to increase.

Rechargeable batteries and hard metals have become the fast growing area of demand for cobalt. Other growing areas of consumption are in superalloys and catalysts. The rechargeable batteries applications account for more than 40 percent of all cobalt consumed in Japan and over 50 percent of the world rechargeable battery market.

**Table 9. SADC Cobalt production (\* not available).**

<b>COUNTRY</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Botswana	225	271	406	334	335	332	320
South Africa	246	190	247	318	296	306	397
Zambia	2,638	2,934	4,830	4,064	7,264	4,247	3,539
Zimbabwe	126	109	106-	120	100	129	79
<b>Total</b>	<b>3,247</b>	<b>3,504</b>	<b>5,589</b>	<b>4,836</b>	<b>7,995</b>	<b>5,014</b>	<b>4,335</b>



### 3.4 Copper

World Copper production increased by some 509 million tonnes to 13.24 million tonnes in 2000 compared to 12.73 million in 1999, reflecting a trend in world production increases since 1995, whilst production from Africa declined over the same period. ( figure 9).

Of even more significance is the fact that only 20% of African copper production is used in refineries in Africa, compared to 53% in America, and Asia and Europe who, despite being major producers, are net importers.

The revival of the copper belt must be accompanied with beneficiation in order to reverse this trend of marginalisation and loss of ground in this global market.

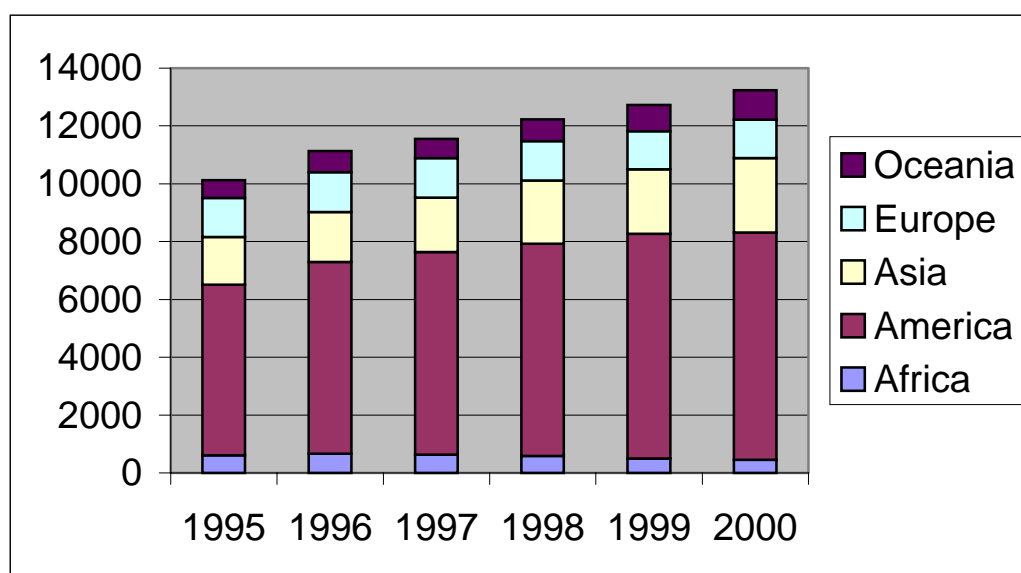


Figure 9 . Global copper mine production. *Source: International Copper Study Group (ICSG).*

Total copper production in the SADC region declined from 466,541 tonnes in 1999 to 420,521 tonnes in 2000. South Africa, Zambia and Zimbabwe recorded decreases in metal production while Namibia and Botswana's output increased.

The tremendous boost in copper production resulted from the resuscitation of mining activities at the old Tsumeb Mine by Ongopolo Mining and Processing. The new company acquired the assets on the Tsumeb Corporation in March, 2000 and at the end of year produced 5082 tonnes of blister copper. There was nil production recorded by the former owner of the mine in 1999.

Copper output from Zambia, the major SADC producer, declined from 360384 tonnes in 1994 to 256,884 tonnes in 2000. Metal production was mainly constrained as a result of many years of lack of investment and maintenance. However, expansion programmes by Chambishi Metals Plc, Non-Ferrous Corporation Ltd of china, Chubuluma Mines Plc and Konkola Mines Limited all which plan to produce 6,000 tonnes, 45,000 tonnes, 17,000 tonnes and 160,000 tonnes at copper per annum respectively, are expected to improve Zambia's output in the years to come.

South Africa's low copper output is largely attributed to a grade decline at Palabora and its transition to reduced output from the underground section. Mine though the Mine still contributes 77 percent of the country's output.

Copper prices in 2000 rose mainly due to increased consumption in Europe and the Middle East as well as due to supply disruptions. Copper (Grade A) at the London Metal Exchange traded at US\$1,813/t in 2000 compared to US\$1573/t in 1999, but prices are still constrained by stock levels on world metal exchanges.

Table 10. SADC copper production.

<b>COUNTRY</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Botswana	22,780	2,046	23,299	19,820	22,124	20,960	20,997
Democratic Republic of Congo (DRC)							
Namibia	30,055	28,784	20,705	24,997	27	0	5,082
South Africa	160,136	162,000	152,000	153,058	164,000	144,000	137,000
Zambia	360,384	307,181	313,984	318,312	282,000	296,604	256,884
Zimbabwe	9,350	8,045	9,028	6,832	2,941	4,977	558
<b>Total</b>	<b>582,705</b>	<b>508,056</b>	<b>519,016</b>	<b>523,019</b>	<b>471,092</b>	<b>466,541</b>	<b>420,521</b>

### 3.6 Diamonds

Global production of diamonds is estimated to have been more than the 1999 output which stood at 111.5 million carats. Russia, Botswana and South Africa are the

world's major gem quality diamond producers, with Australia being a major industrial diamond producer.

The SADC region recorded an increase in diamond production which reached a total of 41,657,456 carats in 2000 from 36,935,177 tonnes in 1999. Angolan production in 2000 was 4,312,837 carats compared to 3,731,747 carats in 1999 valued at US\$735,436,070.

Debswana, in Botswana, produced 24.64 million carats compared to 21.35 million carats in 1999. The increase in output was due to the completion of the second plant at Orapa in May, 2000. At full capacity, production at the mine doubled to 12 million carats at the end of the same year. The completely Automated Recovery Plant at Jwaneng went into full production in June 2000. The Diamond Company was issued with a 25 year mining licence for the production of diamonds near Orapa. Mining is expected to commence in the fourth quarter of 2002.

Namibian diamond production of which marine output accounts for 57.2 percent, declined from 1,639,000 carats to 1,551,591 carats of the end of 2000.

South Africa experienced an increase in diamond production during the review period. Output amounted to 10,805,000 carats, an increase of 783,000 carats from the 1999 production. De Beers is the leading diamond mining company in South Africa and accounts for 94.5 percent of the country's total officially recorded production. In addition it is the world's largest producer of gem quality diamonds, producing around 50 percent of world production. Premier Mine is currently engaged in a \$630 million expansion of the underground operations, that will extend the life of the mine and increase production to 6 million tons of ore per year from the deepened operations.

Diamond production at the Williamson Diamond mine at Mwadu in Tanzania was 320,000 carats in 2000 compared to 234,800 in 1999. Williamson Diamonds Co. Ltd is currently processing its extensive diamond rich tailings and as a result, production is expected to increase to over 30000 carats per month.

The issue of conflict diamonds centres principally on the DRC, Angola and Sierra Leone, in that in these countries it is alleged that diamond trading is used as a means of financing conflict and military spending.

The Institute for Security Studies estimates that the proportion of “conflict diamonds” in the total global diamond trade is less than 10%, while De Beers estimates the number at 3.7%.

Botswana produced diamonds to a value of \$1.78 billion, South Africa \$1.63 billion and Namibia \$430 million in 1999. For Botswana, diamonds provide 33% of gross domestic product, 75% of foreign exchange earnings and 65% of government revenue, while in Namibia diamonds bring in 40% of foreign exchange earnings and the industry is the largest employer in the country.

Furthermore, the diamond cutting industry employs more than 700000 workers.

A concern over possible disruption of the international diamond trade over the issue of “conflict diamonds” is that with 50% of world production coming from South Africa, Botswana and Namibia, the result could have socio-economic consequences, while not addressing the issue at hand.

Various Ministerial meetings have been held to establish protocols for the issuing of certificates of validation that diamonds are traded on a legitimate basis.

Table 11. SADC diamond production.

<b>COUNTRY</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Angola	306,867	671,394	917,419	1,314,182	2,764,858	3,731,747	4,312,837
Democratic Republic of Congo (DRC)							
Botswana	15,550,000	16,802,000	17,707,000	20,111,000	19,639,000	21,263,000	24,645,000
Lesotho	1,200	13,190	3,128	4,203	2,177	2,052	
Namibia	1,312,348	1,381,756	1,400,000	1,416,334	1,439,605	1,639,000	1,551,591
South Africa	10,854,000	9,684,000	9,956,000	10,086,000	10,751,000	10,022,000	10,805,000
Swaziland	12,356,591	11,065,756	11,356,000	11,502,334	12,190,605	11,661,000	12,356,591
Tanzania	17,177	49,129	126,670	122,522	97,830	234,800	
Zimbabwe	173,588	204,416	437,266	421,307	28,732	42,578	23,028

Total	28,215,180	28,805,885	30,547,547	33,475,548	34,723,202	36,935,177	41,337,456
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### 3.7 Gold

Global production of gold decreased from 2,577.7 tonnes in 1999 to 2,455 t during the review period. South Africa is the world's largest producer of gold, producing 430,778 kgs in 2000 followed by the USA 340,000 kgs in 1999 and Australia at 265,000 in 2000. The USA is the world's lowest cost gold producer (cash costs of approximately US\$185 per ounce followed by Canada, Australia and south Africa.

Production of gold in the SADC region continued its declining trend established over the past five years. Output in 2000 was 455,106 kgs compared to 551,608kgs in 1995. Botswana's gold production decrease from 8 kgs in 1999 to 4 kgs during the review period.

Namibia's output increased to 2417.48 kgs in 2000 from 2,008 kgs in 1999.

Navachab mine produced a record 2399 kg during the review period compared to 2008 in 1999. This was partly due to normalisation of production after the 1999 labour related disruption. Ongopolo mining produced some 18.48 kg of gold contained in blister copper.

Total output from South Africa decreased by 4.5 per cent from 580,200 kgs in 1994 to 430,778 kgs in 2000. The decline in output is due to the depletion of high grade reserves, coupled with a declining gold price in real terms, coupled with moderate cost improvements.

The future of gold production in South Africa depends on improved productivity, increased exploration for and the identification of replacement reserves.

Significant improvements in cash operating costs have already been achieved by most operators in South Africa. Recent results have shown AngloGold and Gold Fields Limited both reporting cash costs below \$200/ounce, while Harmony continues to reduce its costs.

New entrants to the gold sector have ensured that job losses have been reduced, as they have been able to takeover marginal operations, and operate them profitably, as has been the case with African Rainbow Minerals, and Afrikaner Lease.

These processes have shown an interesting development, in that gold mines are no longer seen as “cradle to grave” operations in the hands of one owner.

Change of ownership over the mine life, from highly capital intensive operations, to lower grade, lower cost operators, and eventually salvage operators, now epitomizes the industry, and has allowed the entrance of new and responsible operators.

This aspect of sustainability is important, since it allows cash to be generated for future investment, whilst maintaining employment for those who move to the new owners.

Cash generation by African Rainbow Minerals, for example, has been contributory to that company being able to enter into joint venture agreements to start the Maandagshoek platinum venture.

Additionally, several major capital programmes are underway, at the Moab Khotsong Mine (Anglogold), Target (Avgold), the Elandskraal deepening (Harmony), Driefontein deepening (Gold Fields Limited) and the Placer Dome/Western Areas Mine.

Several projects are on hold, awaiting either higher gold prices and/or upgraded geological information.

Tanzania’s total gold production during the review period is estimated to have been more than the 1999 output, which was 4,767 kgs. A number of new gold projects commenced production in 2000, for example the Ashanti Gold Fields gold mine situated in the Geita district, which poured its first metal in 2000. Total output was approximately 177,000 ounces though the mine has an annual planned capacity of 500,000 ounces per year. This mine is now operated as a joint venture with Anglogold.

In another development, Tanzania’s third large-scale gold mine, Bulyanhulu mine situated in the Kahama district has started production, ahead of schedule. First production was expected in the second quarter of 2001 with an annual production of 400,000 ounces of gold, increasing to 500000 ounces in future.

The 5 km long orebody has the potential to produce up to 800000 ounces ultimately. Several other gold projects are at feasibility stage, including the North Mara prospect being evaluated by East African Gold Mines.

In Zimbabwe, gold production declined from 27,144 kgs to 22,007 kgs in 2000. The drop in output is associated with the declining price and the unfavourable economic conditions currently prevailing in the country.

The average annual gold price of US\$278.92 in 1999 was 5.2 per cent lower than that of 1998. From February to June, 2000 the price fluctuated between US\$275 and US\$300 per ounce, and currently remains flat in a range of US\$265-275 per ounce.

Table 12. SADC gold production

<b>COUNTRY</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Botswana	234	86	5	28	1	8	4
Mozambique	336	236	67	0	0	0	
Namibia	2,430	2,099	2,145	2,416	1,885	2,008	2,417
South Africa	580,200	523,815	498,300	490,600	465,100	451,300	430,778
Tanzania	2,861	1,413	1,300	232	427	4,767	
Zimbabwe	20,512	23,959	24,677	24,226	25,175	27,114	22,007
<b>Total</b>	<b>455,206</b>	<b>551,608</b>	<b>526,494</b>	<b>517,502</b>	<b>492,588</b>	<b>485,197</b>	<b>455,206</b>

Gold consumption in the year 2000 reached record levels of 3281 tons, compared with 2864 tons in 1995, and 2267 tons in 1990 (World Gold Council), as measured in countries which account for 80% of demand.

A continued shift towards jewelry demand, and decreased investment demand, resulted in a 21% reduction in investment demand, more than offset by the increased demand from the jewelry sector.

World mining output of 2568 tons in 2000 was well short of the 3944 tons of demand, but the buffer of surface gold stocks and central bank selling, has not yet had an effect on price, in terms of classical supply and demand market theory.

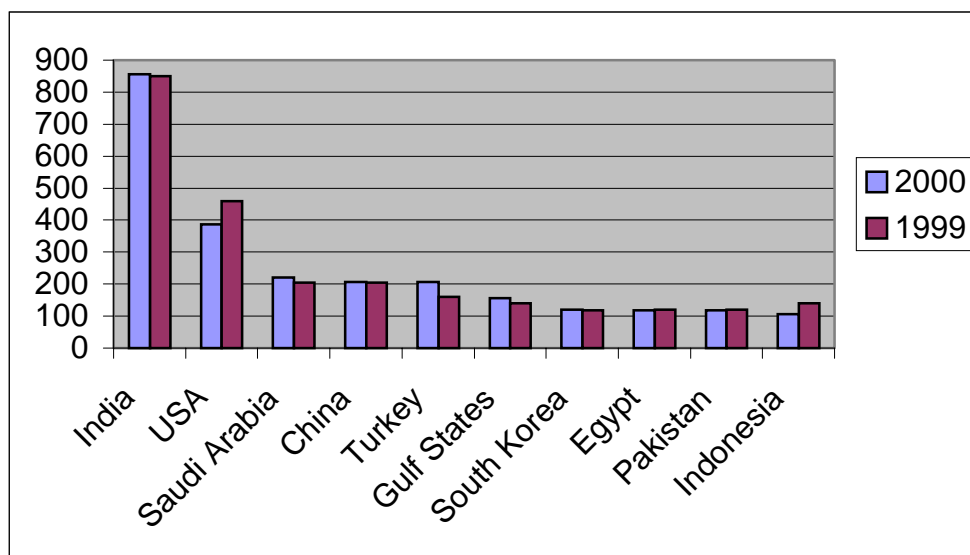


Figure 10. Major demand markets for gold. *Source: Gold Fields Mineral Services*

Analysts expect this dynamic to become effective within the next three years, which would bode well for the SADC gold mining industry.

Such a situation is made more attractive given the exhaustion of shallow, low cost operations in Australia.

### 3.8 Nickel

World nickel production marginally increased from 1,020 000 tonnes in 1999 to 1,080,000 tonnes in 2000. Increases in production in 2000 were recorded in Canada, Japan, Australia whose output were 134,000 tonnes, 161,000 tonnes and 112,000 respectively. Russia, which is the world's major producer of nickel registered a decline in output. Its production dropped to 221,000 tonnes in 2000 from 228,000 tonnes during the previous year.

Total nickel output in the SADC region declined to 66,797 tonnes in 2000 from a high of 68, 692 tonnes in 1999, although production levels have increased slightly



since 1994. This has been due to increases in output from South Africa and Botswana, and a decrease from Zimbabwe from the ageing Bindura Mine.

Botswana produced 24,229 tonnes compared to 22,898 in 1999, and 19,041 tonnes in 1994.

South Africa's production remained stable at 36,600 tonnes in 2000. Nickel mine output is mostly a by-product from platinum-group metals (PGM) mining with some portion arising from copper mining. Thus mine production of 36,000 tonnes in 2000 mostly reflects the performance of PGM mining.

Mean while, nickel output in Zimbabwe dropped from 13,516 tonnes in 1994 to 5,968 tonnes in 2000.

Like many other metals apart from gold, nickel staged a recovery in price during 2000 which increased from an average of US\$6,011 per tonne in 1999 to US\$7959.69 tonnes.

Table 13. SADC nickel production.

<b>COUNTRY</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Botswana	19,041	18,088	22,095	20,157	22,851	22,898	24,229
South Africa	30,800	29,803	33,861	34,830	36,700	36,200	36,600
Zimbabwe	13,516	10,864	10,864	10,134	10,135	9,594	5,968
<b>Total</b>	<b>62,692</b>	<b>58,757</b>	<b>67,630</b>	<b>65,121</b>	<b>69,686</b>	<b>68,692</b>	<b>66,797</b>

### 3.9 Platinum Group Metals (PGMs)

Global supplies of PGMs were estimated to be over the 1999 output of 417,000 kgs. South Africa is the world's largest PGM producer followed by Russia. South Africa accounts for over 46 per cent of the total world production of PGMs and holds about 55 per cent of global reserves. Russia is the world's leading palladium producer (40 per cent of global output) while South Africa dominates platinum and Rhodium supply. Constant demand for PGM's comes from Japan and the USA.

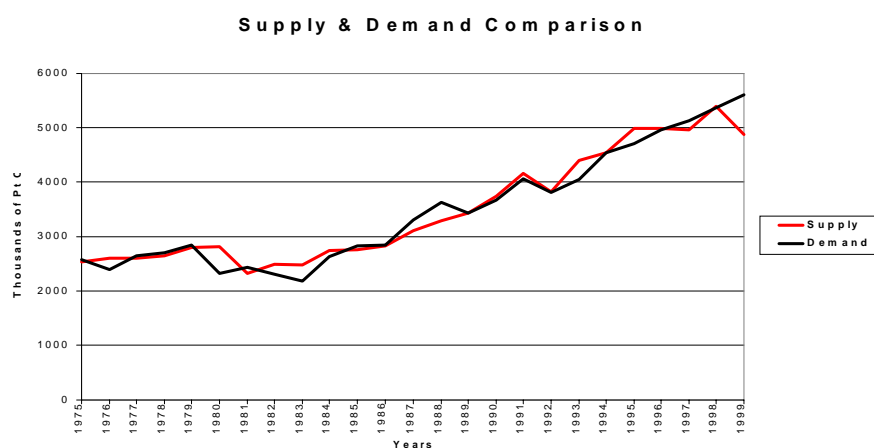


Figure 11. Platinum supply and demand, 1975-present. *Source: Anglo Platinum*

The SADC region's total output of PGMs showed a slight decline from 217,167 kgs in 1999 to 207,704 kgs in 2000, but remains on an overall upward trend.

Total output of PGMs in Zimbabwe rose to 904 kgs in 2000, from a low of 698 kgs in 1999.

New developments in Zimbabwe's platinum sector includes the conclusion of an agreement between Zimplats and BHP in which BHP is to purchase Zimplats 67 per cent interests in the Hartley Platinum Joint Venture and 61.3 per cent interest in the Mhondoro Platinum Joint Venture. Mining at Zimplats/ Ngezi Open Cast Platinum is expected to commence during the second quarter of 2001. The mine is expected to produce 2.2 million tonnes of ore per annum and will use the Hartley Metallurgical Complex for toll milling of its ore. In another development, the Government and

Anglo American Corporation are negotiating terms for the development of Unki Platinum Mine.

Production of PGMS in South Africa dropped to 206,800 kgs in 2000, compared to 216,469 kgs in 1999. Despite this trend, exploration efforts have intensified across the Bushveld complex. In addition, increased global demand for PGMS in recent years has led South African producers to commit themselves to major capital expenditure programmes. During 1999-2000, a total of US\$ 3,326 million was committed to mineral-related projects of which 80 per cent is for primary minerals and 20 per cent for processed mineral products. Platinum projects account for 31 per cent (ie US\$1,442 million) of the total for primary minerals. Furthermore, investments of US\$157 million in platinum projects are being considered as referred to in previous sections.

The price of PGMs have been on the increase, with Palladium, Platinum and Rhodium reaching their highest levels of US\$800/ozt, US\$480/ozt and US\$570/ozt respectively in 2000. During November and December, 1999, platinum and palladium traded above US\$400/ozt and US\$390/ozt respectively.

The recent surge to over \$1000/ounce for palladium has receded, and generally prices have fallen below their recent highs.

In terms of revenue to South Africa, the year 2000 saw gross revenue from PGM production, at R29 billion, exceed that of gold, at R27.5 billion, for the first time.

The 6% drop in platinum production from South Africa's mines in the year 2000, was against an increase of 5.9% in supply globally, from a 109% increase from Russia, and a 5% increase from North America.

There was also a 346% increase in Rhodium supply from Russia, accompanied by a decrease elsewhere.

It is likely, according to Johnson Matthey, that demand will exceed supply for some time, thus maintaining strong prices, and encouraging the expansion of PGM industries in Southern Africa.

These opportunities will form a valuable foundation for the sustainable development of the minerals industry.

Table 14. SADC production of platinum group metals.

Country	1994	1995	1996	1997	1998	1999	2000
South Africa	183,925	183,097	188,636	196,600	200,000	216,469	206,800
Zimbabwe	0	0	18	607	4,774	698	904
<b>Total</b>	<b>183,925</b>	<b>183,097</b>	<b>188,654</b>	<b>197,207</b>	<b>204,917</b>	<b>217,167</b>	<b>207,704</b>

### 3.10 Zinc

Global zinc production was estimated to rise to 8.51 metric tonnes in 2000 from 8.4 metric tonnes in 1999 with the largest production from Australia and Ireland.

A total of 136,235 tonnes of zinc was produced in the region. Namibia and South Africa are the major zinc producers in the SADC region.

Rosh Pinah Zinc Company in Namibia increased its output by some 13 per cent during 2000 to 391.26 tonnes from 34,639 tonnes the previous year. Concentrated grade at the mine also improved from 50.06 per cent in 1999 to 53.21 per cent in 2000. Rosh Pinah has committed a total of US\$3,956,723 (N\$32 m) for expansion of its ore production capacity.

In another development, construction of the Skorpion Zinc Project with a planned capacity of 150,000 tonnes per year in the South of Namibia was approved by the Anglo-American Plc board in 2000, and is currently underway. With these developments, zinc output in Namibia is expected to increase significantly.

South Africa's zinc mine output declined from 76,361 tonnes in 1994 to 62,700 tonnes in 2000. However, several zinc projects have been planned. These include the newly discovered down-dip extension at Anglo Base Metals Black Maintain Mine and the US\$920 million Gamsberg integrated zinc mine project whose feasibility

study was completed in July, 2000. Construction of this project is to commence first quarter 2001 while production is expected by mid-2003. Furthermore, 6 million tonnes of ore per year will be mined at Gamsberg mine.

The London Metals Exchange (LME) cash settlement price for zinc increased from an average of U\$S1077.32 per tonne in 1999 to an average of US\$1144.8 per tonne in 2000.

**Table 15. SADC zinc production.**

<b>COUNTRY</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Namibia	64,568	59,207	35,873	72,816	78,517	71,000	73,535
South Africa	76,361	71,118	77,029	71,062	69,630	69,735	62,700
Zambia	102	0	0	0		0	
<b>Total</b>	<b>141,031</b>	<b>130,325</b>	<b>112,902</b>	<b>143,878</b>	<b>148,147</b>	<b>140,735</b>	

**Table 16. SADC lead production.**

<b>Country</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Namibia	23,813	29,752	18,845	1,530	175	19,000	20,665
South Africa	95,824	88,501	88,600	83,100	84,100	80,191	75,300
<b>Total</b>	<b>119,637</b>	<b>118,253</b>	<b>107,445</b>	<b>84,630</b>	<b>84,275</b>	<b>99,191</b>	<b>95,965</b>

## 4.0 DEVELOPMENTS IN SADC MEMBER STATES

### 4.1 Macro-economic Indicators

The following tables illustrate the macro-economic indicators, available for each country.

#### 4.1.2 Angola . (Table 16).

Currency	Kwanza (Kz)
Exchange rate	US\$1=Kz19,703 (March, 2001)
GDP	US\$11.0 billion (1998 est)
Inflation	25% (1999 est)
Contribution of mining to GDP	10%
Major minerals produced	Diamonds, industrial minerals
Value of mineral production (US\$)	Diamonds US\$735,436,070
Contribution of mining to foreign exchange earnings	
Principal mineral exports	crude oil, diamonds, refined petroleum, cement
Contribution of mining to state revenue	99%
Total labour force in the mining industry	24000
Major countries exported to	USA, Germany, Belgium, Common Custom Area
Exploration expenditure (US\$)	US\$18,500,000 (2000 est)

Numbers tend to be skewed as a result of recovery from years of civil war, as evidenced by the extremely high level of dependance by the State on revenue from mining operations. Angola has significant opportunity to develop its minerals industry, given its resources and its seaboard. This however will rely on establishment of adequate infrastructure, development of human resources and its ability to develop secondary industries

#### 4.1.3 Botswana (table 17)

Currency	Pula (P)
Exchange rate	US\$1=4.7281P (Feb 2000)
GDP	US\$2.25 billion (1998 est)
Inflation	7.2% (1999 est)
Contribution of mining to GDP	35%
Major minerals produced	Diamonds, Copper, Nickel, Cobalt, Coal
Value of mineral production	Diamonds US\$2.1 billion, copper US\$90 m
Contribution of mining foreign exchange earnings	
Contribution of mining to state revenue	50%
Total labour force in the mining industry	12,961(2000)
Major countries exported to	Europe, common customs area, Zimbabwe, USA
Exploration expenditure	nil

A stable economic and political environment has resulted in growth in the minerals industry. Botswana has an economy heavily reliant on the minerals sector.

#### 4.1.4 Democratic Republic of Congo (DRC)

Currency	Congolese franc(CF)
Exchange rate	US\$1=4.5 CF (Jan 1999)
GDP	US\$34.9 billion (1998 est)

Inflation	
Contribution of mining to GDP %	
Major minerals produced	gold, copper, cobalt, zinc, coal, lime, diamonds
Total Value of mineral production	diamonds, US\$1m copper US\$1m) cobalt US\$ 1m, gold US\$ 1m (1997 est)
Contribution of mining to foreign exchange earnings	
Principal mineral exports	diamonds, copper, cobalt, gold, crude oil
Contribution of mining to state revenue (%)	
Total labour force in the mining industry	
Major countries exported to	Belgium, France, Germany, Japan, South Africa, USA
Exploration expenditure	

This country has vast untapped mineral wealth, which cannot be realized before political and economic stability are established. The establishment of a secure infrastructure is also essential.



#### 4.1.5 Lesotho (table 19)

Currency	Loti (L) (plural Maloti (M))
Exchange rate	US\$1=6.15 M
GDP	US\$5.1 billion
Inflation	8.7%
Contribution of mining to GDP	0.1%
Major minerals produced	sandstone, clay, diamonds
Value of mineral production	diamonds US\$74,000 (1999) exports only
Contribution of mining to foreign exchange earnings	
Principal mineral exports	diamonds
Contribution of mining to state revenue	
Total labour force in the mining industry	550 (1998)
Major countries exported to	South Africa
Exploration expenditure	

The country has a small domestic dependency on mining, but a very significant dependency in terms of employment through migrant labour, in South Africa. This puts the economy at risk, and highlights the need to diversify the economy base through tourism and other industries which can take advantage of the Lesotho Highlands hydroelectric scheme.

4.1.6 **Malawi** (table 20)

Currency	Malawi Kwacha (MWK)
Exchange rate	US\$1=48.00 MWK
Inflation	44.9%
GDP	US\$1.7 billion
Contribution of mining to GDP	1%
Major minerals produced	coal, gemstones, dolomite, cement, lime, stone aggregate
Value of mineral production	US\$ 29 million
Principal mineral exports	coal, gemstones, lime, cement
Contribution of mining to foreign exchange earnings	0.2%
Contribution of mining to state revenue	
Total labour force in the mining industry	3,700 (1999)
Major countries exported to	Tanzania, Europe, USA, Asia
Exploration expenditure	

#### 4.1.7 Mozambique (table 21)

Currency	Metical (Mt)
Exchange rate	US\$1=13,837Mt (February 2000)
GDP	US\$16.8 billion (1998 est)
Inflation	-1.3% (1998 est)
Contribution of mining to GDP %	-2%
Major minerals produced	Graphite, bauxite, gold, bentonite
Total Value of mineral production	Graphite US\$12m, bauxite US\$0.05m, gold US\$ 0.05m (1998)
Contribution of mining to foreign exchange earnings	
Principal mineral exports	Graphite, Bauxite, Bentonite
Contribution of mining to state revenue (%)	
Total labour force in the mining industry	
Major countries exported to	
Exploration expenditure	US\$15,5m (1998)

Infrastructural devastation from war and floods has made exploration and development difficult. The focus of government revenues, small as they are, on alleviating the after effects of these events, detracts from the need to develop a diversified economy and favourable investment climate. The country desperately needs to benefit from the advantages of regionalisation. However, investment in aluminium and heavy metals projects will add value.

#### 4.1.8 Namibia (table 22)

Currency	Namibian Dollar (N\$)
Exchange rate	US\$1=8.0875 N\$ (26 <sup>th</sup> March, 2001)
Inflation	7.7% (1999)
GDP	21,124,000,000 N\$
Contribution of mining to GDP	9.7%(1999)
Major minerals produced	gold, silver, diamonds, semi-precious stones, copper, lead, zinc, industrial minerals, nuclear fuel minerals
Value of mineral production	diamonds (3, 657 637 000 N\$), uranium (N\$ 4, 104, 983, 000 (2000))
Contribution of mining to foreign exchange earnings	40% (1999)
Principal mineral exports	diamonds, copper, gold, zinc, lead, uranium
Contribution of mining to state revenue	720, 000, 000 (N\$)
Total labour force in the mining industry	6248 (2000)
Major countries exported to	South Africa, Europe, Far East
Exploration expenditure	167,000,000 N\$ (2000)

Namibia has, by definition, a minerals based economy, and is currently entrenching that position through increased investment in exploration. The country needs to establish beneficiation and secondary industries.

The country has good and bad case histories of joint venture arrangements with mining companies, those of Rossing and Namdeb as being particularly good, in terms of joint efforts at skills development.

#### 4.1.9 South Africa (table 23)

Currency	Rand (R)
Exchange rate	US\$1=6.2860 R (February, 2000)
Inflation	6% (1999 est)
GDP	US\$290.6 billion (1998 est)
Contribution of mining to GDP	6.5% (1999)
Major minerals produced	aluminum, asbestos, chrome, coal, copper, diamonds, manganese, ferrous and non-ferrous metals, gold, iron, lead, nickel, PGMs, uranium, zinc
Value of mineral production	gold (US\$4.1 billion), coal (US\$2.9 billion) PGMs (US\$2.4 billion) (1999)
Contribution of mining to foreign exchange earnings	34.4% (1998), 36.0% (1997)
Principal mineral exports	gold, PGMs, coal
Contribution of mining to state revenue	1.1%
Total labour force in the mining industry	436,702 (1999), 469,045 (1998)
Major countries exported to:	Italy, Japan, USA, Germany, UK, South Korea, Botswana, Namibia, Swaziland, Lesotho
Exploration expenditure	

The South African economy is no longer minerals dependant. As the economic hub of the SADC, it must be influential in the establishment of effective regionalisation. South Africa is examined in more detail later.

#### 4.1.10 Swaziland (table 24)

Currency	Lilangeni (Plural-Emalangeni) (E)
Exchange rate	US\$1=6.1579 E (February, 2000)
Inflation	8% (1999 est)
GDP	US\$4 billion (1998 est)
Contribution of mining to GDP	4.7%
Major minerals produced	asbestos, coal, diamonds, stone
Value of mineral production	asbestos (US\$9.50m), coal (US\$8.62m) stone (US\$1.63m) 1998
Contribution of mining to foreign exchange earnings	2%
Principal mineral exports	asbestos and coal
Contribution of mining to state revenue	23% (1998 est)
Total labour force in the mining industry	1340(1997) 1702 (1998) 1587 (1999)
Major countries exported to	South Africa, Asia, USA
Exploration expenditure	US\$3m (1997)

Despite having a relatively small minerals sector, the country is also heavily dependant on income generated and brought to the country by migrant labourers.

#### 4.1.11 Tanzania (table 25)

Currency	Tanzania Shilling (Tsh)
Exchange rate	US\$1=821 Tsh (18 <sup>th</sup> March, 2001)
Inflation	7.8% (1999 est)
GDP	US\$7.63775 billion (1999 est)
Contribution of mining to GDP	27.4% (1998) 17.0% (1997)
Major minerals produced	gold, diamond, gemstones
Value of mineral production	diamonds (US\$32.35 million), gold (US\$38.95 million), gemstones (US\$14.04 million), phosphate (US\$0.23 million)
Contribution of mining to foreign exchange earnings	2.0% in 1998 to 2.1% in 1999
Principal mineral exports	diamonds, gold, gemstones, phosphate
Contribution of mining to state revenue	2.1% while in 1998 was 2.0%
Total labour force in the mining industry	1.5 million
Major countries exported to	USA, France, India, Thailand, Israel, Japan
Exploration expenditure	US\$20 million (1999 est)

Tanzania is heavily dependant on its minerals sector, and has the highest growth of the minerals industry in the SADC. With ever increasing influx of foreign capital and mining companies into the country, it is important that the Government encourage these operators to invest in downstream beneficiatrimon, whilst also stimulating secondary industry.

#### 4.1.12 Zambia (table 26)

Currency	Zambian Kwacha (ZK)
Exchange rate	US\$1=2,880 ZK (February, 2000)
Inflation	27% (1999 est)
GDP	US\$8.3 billion (1998 est)
Contribution of mining to GDP	15%
Major minerals produced	copper, cobalt, coal, gemstones, building and industrial minerals
Value of mineral production	copper (US\$712m), cobalt (US\$186m), emeralds (US\$ 9m)
Contribution of mining to foreign exchange earnings	80%
Principal mineral exports	copper, cobalt, gemstones , dimension stones
Contribution of mining to state revenue	13%
Total labour force in the mining industry	25000
Major countries exported to	Japan, Saudi Arabia, EU, South Africa
Exploration expenditure	US\$20million

Zambia is also minerals dependant. Whilst the minerals industry can stimulate economic revival, industries such as copper and cobalt mining should be encouraged to establish downstream and secondary industries, to satisfy the demands of the regional manufacturing sector.



#### 4.1.13 Zimbabwe (table 27)

Currency	Zimbabwean Dollar (Z\$)
Exchange rate	US\$1=43.4197Z\$ ( 2001)
Inflation	70% (1999 est)
GDP	US\$26.2 billion (1998 est)
Contribution of mining to GDP	
Major minerals produced	asbestos, coal, cobalt, copper, diamonds, gold, nickel
Value of mineral production	US\$431, 485.036 (1999), US\$482,613,614 (1998)
Contribution of mining to foreign exchange earnings	
Principal mineral exports	gold, asbestos, nickel, copper, Ferro chrome, granite
Contribution of mining to state revenue	
Total labour force in the mining industry	48091
Major countries exported to	United Kingdom, Germany France, Republic of Korea, Japan, United States of America, Italy, Spain, Switzerland, Malawi, Zambia, Botswana, South Africa
Exploration expenditure	US\$8,995,227 (1999)

As Zimbabwe heads towards economic and political chaos, only a significant change in policy is likely to prevent complete isolation.

## **4.2. Policy and Administration Changes**

### **4.2.1. Policy**

In assessing the role of mining in the economic success of the region, it is important to consider policy developments and initiatives, in order to assess the status of the region's collective readiness for investment.

In Angola, mining and petroleum development are governed by several legal statutes, most of which have been updated within the last few years. Through mineral policy reform and institutional strengthening, the government of Angola has created opportunity for business in mineral development.

Beside the mineral potential, Angola has also an enabling legal and fiscal framework for investing in mining business.

Over the last years, the mining legislation has evolved according to the government and country's vision. In view of this established fact the government of Angola has initiated some reforms to improve the development of the sector. The most significant initiatives are:

- Revision and regulation of the Mining Law 1/92 and the Diamond Law 16/94;
- Establishment of company of Commercialization of Angolan diamonds;
- Establishment of new systems for better control of marketing of Diamonds;
- Reduction of the size of the diamond concessions for better control of mining and avoid sleeping investors;
- Creation of the Guiche Unique for diamond security;
- Creation of computerized Geological and Mining Data Base of the country;
- Establishment of Geographical Information System (GIS).

This whole legal and institutional framework has re-established private and foreign investor's trust in the country. These initiatives are aimed at encouraging foreign investment into the country, after the cessation of civil war. Current difficulties being

experienced by De Beers indicate that these intents have not all been turned into practice.

In Botswana the new Mines and Minerals Act was passed by Parliament in 1999 and became effective on 1<sup>st</sup> December, 1999.

The key feature of the revised licencing policy is that the whole process from prospecting to mining will be automatic and predictable, removing some of the uncertainty and stages of negotiation which previously existed.

Botswana's general mining policy aims at maximising the national economic benefit from development of mineral resources.

Disruptions caused by the civil war in the Democratic Republic of Congo in 1997, and the uncertain investment policies of the new Government were a setback to the proposed new mineral development policies needed to revitalise the mineral economy of the DRC. Historically, the mining industry accounted for 25% of GDP and about three quarters of total export revenues.

The first Mining Policy Dialogue Seminar, for the DRC was held in February, 2000 in Kinshasa. The event was organised by the Ministry of Mines with the assistance of the World Bank. The Minister of Mines declared the commitment of the DRC Government to reform its mining policy and adopt an attractive set of mining regulations to encourage foreign investment.

As a result of these initiatives, renewed exploration and mining activity has begun in some areas of the country.

Other prospective areas, however remain inaccessible, or carry extremely high risk, even beyond that acceptable for risk insurance through agencies such as the Multi Lateral Investment Guarantee Agency (MIGA).

In Lesotho the development strategy for this sector is consistent with that of the

national development plan in that it needs to create a conducive environment for private sector participation in investment, management and operation of the sector.

The Lesotho Mining rights Act (Act 43 of 1967) provides for rights to prospect and mine for minerals in the country. The Government is currently working on a new minerals Act consistent with changing circumstances and emerging opportunities with a desire to promote private investment in the sector.

Malawi's present Mines and Minerals Act which was enacted in 1981 is to be reviewed to make the mining industry in the country attractive and competitive in the region.

The overall policy objective is to maximise the economic benefit to the nation that can be realised from the exploitation of the nation's mineral resources. The government encourages investors to explore, delineate, evaluate and where viable exploit the resource using appropriate technologies.

The overall national policy for mineral resources sector is to attract investment and obtain optimum benefit to Mozambique from present and future mineral development. In pursuit of this goal, policy objectives include increasing mineral production, minimising government participation in mining activities, employment creation and protection of the environment.

To achieve this proposed mining law framework a mining policy dialogue was held in Maputo at the end of July, 1999. Mines that were formerly state run now operate by wholly private and joint venture companies.

Namibia's new Diamond Act came into operation on the 1<sup>st</sup> of April, 2000. A joint committee, comprising representatives of the Ministry of Mines and Energy and the Chamber of Mines, formed to revise the provisions of the present Minerals Act hopes that a revised draft will be completed during the second quarter of 2001. In addition to the Act itself, Mineral Licensing Regulations are being drawn up, whilst the Health and Safety Regulations have been completed.

Tenders for consultancies to draw up a Minerals Policy are currently being evaluated. It is hoped that work on the Policy document will start in the first quarter of 2001.

Also, as mentioned elsewhere in this report, the Government has developed a strategic plan aimed at ensuring that the minerals industry of Namibia remains competitive. The plan has as its mission statement “The Ministry of Mines and Energy, as the custodian of Namibia’s rich endowment of mineral and energy resources, facilitates and regulates the responsible development and sustainable utilization of these resources for the benefit of all Namibians”.

The document aims to create a favourable climate for investment, based on an increase in geological information available to potential investors.

After 1994 the Department of Minerals and Energy developed a policy which culminated in the finalisation of a white paper on A Minerals and Mining Policy for South Africa in October, 1998. A new Mine Health and Safety Act was implemented in January, 1997.

Since January 1999 the Department of Minerals and Energy, has been busy converting the policy contained in the new Minerals and Mining Policy into legislation. The draft Mineral Development Bill is currently under public discussion, and has as its main aim, to return the ownership of mineral rights to the state. This has raised concern from the Chamber of Mines, who believe that the Bill opens the door to possible expropriation of mineral rights ownership, and threatens security of tenure.

The Bill also contains reference to the encouragement of downstream beneficiation, which also raises concerns that enforcement of beneficiation could result in increased costs, which could discourage investment.

Recently, broad agreement was reached between the parties, on most issues, whereby certain guarantees were built into the enactment of the Bill. Discussions are continuing, in an open and transparent manner.

A Mining Sector Summit, was held on Friday 25<sup>th</sup> and Saturday 26<sup>th</sup> February, 2000 in accordance with the Job summit declaration. The objective was to develop:-  
A sector strategy for the mining industry in terms of job creation and job quality;

A national vision that brings about positive changes for the whole industry in all its commodity sectors.

The outcome of the summit was consensus on five sector strategies to achieve the stated objectives as follows:-

- i) An industry promotion strategy in order to disseminate reliable information about the industry that attracts appropriate investment;
- ii) A Mineral Beneficiation strategy to both add value to exports and increase employment levels is in the process;
- iii) An employment and human resources development strategy for sustaining and enhancing existing jobs and protecting vulnerable workers;
- iv) A strategy to manage the impacts of cyclical volatility in the mining industry to reduce job losses and alleviate the social impacts of mine downscaling when this does occur;
- v) coordinated rural development strategy, to enhance the potential for alternative forms of employment particularly in labour sending areas.

There is no stated comprehensive mineral resources development policy in Swaziland. However, attention is being paid to the diversification of mining activities currently being undertaken, that is increasing the range of minerals produced. The existing mining legislation is being reviewed and updated from time to time as need arises. Plans are also underway to develop legislation specific to small scale mining.

The policy of the government of Tanzania is to encourage and promote private sector mineral exploration and development. The Government will no longer directly involve itself in mineral exploration and extraction activities. Instead it aspires to benefit from mineral development through revenues generated, employment and regional development. Therefore the thrust is making the mining sector attractive to the private mining companies.

Administration of the mining sector is the responsibility of the Ministry of Energy and Minerals under the Mining Act of 1998.

The Government of Zambia has developed a mining policy which aims at encouraging private investment in exploration and mining, although certain mining companies have found negotiations for licenses and permission unwieldy.

The Government has withdrawn direct participation in the operations of the mines, but retains a financial interest in most cases.

With regards to Fiscal Policy, the Ministry has prepared a Memorandum to Cabinet on Proposals for a Revised and Consolidated Fiscal Framework for Mining in Zimbabwe. These proposals have been designed to address some of the difficulties facing the whole mining industry and to encourage mineral exploration, development of new mines and expansion of existing mines. In addition the proposals seek to address the problems associated with development of the platinum sector by offering an additional tax incentive. The proposals aim to ensure that the mining investment regime in Zimbabwe maintains its competitiveness in the face of heightened competition for mining capital and provides relatively assured revenue for the Government. While addressing the risk/return concerns of investors, the proposals also seek to ensure that the Government gets a share of mine life profits that is fair by international mining industry standards.

The proposed fiscal regime has been presented to the Cabinet Committee on Investment. Most of the issues were agreed on by the Working Party and have already been included in the 2001 Budget presented to Parliament by the Minister of Finance and Economic Development.

On the other hand, the Ministry is in the process of preparing a Gaseous Hydrocarbons White Paper whose purpose is to lay out Government policy on a broader spectrum of gaseous hydrocarbons as a first step in encouraging private sector participants to develop a significant gas industry in Zimbabwe. The new potential sources of gaseous hydrocarbons that have potential for economic utilization in Zimbabwe are:

- Coal Bed Methane
- Gas from gas gasification of coal
- Associated and non-associated natural gas imported from other countries.

Government intervention is required to kick start the gas industry, particularly in providing an adequate legal framework for the exploration and extraction of coal bed methane, a regulatory framework for coal gasification and provision for transportation and storage of gaseous hydrocarbons. Recognising the capital-intensive nature of the industry, Government is also willing to establish a package of investment incentives.

A review of Functions of Parastatals is being carried out in such a way that the Minerals Marketing Corporation will change its focus to enhance indigenous participation in the mining sector. Furthermore, the short term efforts will centre on minerals like tantalite, chrome ore, precious minerals, etc, while the medium to long term focus will be on value addition to minerals. The Corporation will also tighten loopholes to ensure minimal foreign currency leakages.

The Zimbabwe Mining Development Corporation will be restructured and a fast track privatisation programme will be implemented taking into account the indigenisation process. This is part of fulfilling Government's intention to divest from the mining sector.



## **4.2.2 Administration of the Sector**

The Government of Angola is deeply committed in solving the political, economic and social problems. Notwithstanding the difficulties that the country is facing everyday, all the efforts of the government are shifted to reach the peace process as the main objective and continue the restore of State administration areas previous occupied illegally by the rebels and to defend the territorial integrity.

During the year under review the government carried out several actions in order to improve the economic and social situation of the country. In this regard, a lot has been happening in the mining industry in Angola, particularly in the diamond sector where measures taken by the Government responded to the concern of the international community, mainly to the UN sanctions. In this regard, the reality today is different.

The Angolan Government has stated that one of its key objectives in establishing control over all diamond sales is to boost tax revenue, which was extremely low, because of the failure of mining companies to declare significant taxable profits.

The government of the Republic of Angola hopes to boost official diamond output and considers that the measures taken in the diamond industry are extremely important and necessary for the stabilization of this strategic sector for the socio economic development of the country. As a result, these different measures implemented in the diamond industry have had success in raising tax revenue for the Government.

The Geological Survey and Mines Department of Malawi are currently operating under the umbrella of the Ministry of Natural Resources and Environmental Affairs following re-organisation of government ministries during the year.

The institutions in the sector are planning to hold a Minerals Exhibition from 3<sup>rd</sup> - 5<sup>th</sup> August, 2000, to promote the mineral resources of the country. This is likely to attract investment in the minerals sector.

In Tanzania, an independent Mining Advisory Committee was appointed in April 2001. This is in accordance with the provision in the Mining Act, 1998.

The Madini Institute of the MEM located in Dodoma is charged with the responsibility of training Mineral/Mining industry technicians is due to be opened soon, while the Faculty of Mining Engineering at the University of Dar es Salaam will be established in the year 2001.

The Southern and Eastern Africa Mineral Centre located in Dar es Salaam offers laboratory, Consultancy and Training courses related to Mineral Sector development programmes.

In Zambia, privatization of the State controlled ZCCM operations has been undertaken. The process has taken several years to enact, but developments include the following.

Konkola Copper Mines Plc, a subsidiary of Anglo American Plc, bought Konkola, Nchanga and Namupundwe Mines, with a view to operating these mines, and developing the Konkola Deep project;

Mopani copper Mines Plc bought Mufulira and Nkana, and Konkola copper Mines are the interim managers of ZCCM's Nkana smelter, refinery and acid plant for a period of three years after which the assets will be sold to Konkola Copper Mines.

In Zimbabwe, following the June 2000 elections the Mining division of the former Ministry of Mines, Environment and Tourism was combined with the Energy division of the former Ministry of Transport and Energy to form the Ministry of Mines and Energy

With regards to changes to legislation, incentives etc. to promote mining activities the following incentives apply:

- Corporate tax for mining is at 25 %
- Mining companies have the right to carry over losses indefinitely.
- Exploration Expenses may be deducted as it is incurred or carried forward until income is realised.

### ***5.0. Geological exploration and mapping.***

The mining sector 5 year strategies developed by the SADC in 1992 and 1997, identified that integration of geological mapping and databases was essential, and that this could only be done once information was available per country, in common formats. It was identified that it was necessary to :

- Strengthen National/Regional Institutions involved in geological studies
- Encourage greater cooperation amongst the region's geological surveys
- Identify potential commodities for exploration and development
- Encourage publications on geology, mineral deposits and mining in the SADC

### **5.1. Progress in regional mapping achieved during the year 2000**

Forty five per cent (45%) of Angola has been mapped to date.

There was little field mapping during the year 1999 in Botswana. Limited field work was confined to exposed parts of Karoo strata throughout the Karoo super-group basin in Botswana.

Lesotho has been completely mapped

There is no regional mapping being undertaken in Malawi at the moment. The only mapping being undertaken are related to mineral exploration targets.

In 1999 Mozambique carried out a geological mapping project in the western part of Niassa province. The project is funded by the Mozambican government.

One hundred per cent of Namibia has been mapped while 75% of the country at a scale of 1:250,000 is being re-mapped. In addition, 25% of some areas is being re-mapped in greater detail.

With regards to regional high resolution airborne geophysical surveys, a total of 2 000 000 line km were flown in total of which 810 000 line km were flown during the year 2000. A total of 45% of Namibia is covered by high resolution geophysical surveys.

In another development, a geophysical programme is underway to improve the gravity measurement coverage of Namibia.

Furthermore, the Geological Survey of Namibia has started a regional geochemical survey towards the end of the year 2000.

During the past year South Africa completed its revision mapping . Detailed small scale mapping of a number of areas progressed well.

Engineering geological mapping has now been expanded to all provinces in South Africa. In order to enhance the accessibility to the contents of the Geoscience maps which the Council produces, especially for those parts of the Nation with a relatively weak public understanding of science and technology, two new map series were developed. The one series, published on both 1:50,000 and 1:250,000 scales indicates the potential for developing construction raw materials (e.g bricks, tiles, building sand etc) and mining opportunities. The second series depicts the geology in terms of the application of rock formation for the fabrication of specific products.

Fifty three per cent (53%) of Zambia has now been mapped.

During the year no field mapping was carried out in Zimbabwe, but interpretation of remotely sensed data was used to produce preliminary reconnaissance maps.

Currently the geological map of Zimbabwe is being upgraded and a draft copy is now complete and is being edited.

Geological mapping coverage covers an area of 70%. Most of the maps have been published but there are some awaiting publications.

## 5.2. Exploration Programmes

The Geological Survey Institute of Angola continued with various exploration works, mainly in Kwanza Sul and Bengo Provinces, providing technical services to some private local companies.

A number of private companies complimented government effort in mineral exploration. These included the current exploration projects carried out by the following private companies: De Beers (diamonds), Southern Era (diamonds), Catoca Company (diamonds), Eroap (Sodalite), Hydromina (underground water).

Exploration expenditure is estimated at about USD 18,500 million, related to the activities carried out during the year under review. As a result of exploration works carried out by the De Beers more than 54 new Kimberlite pipes were discovered. There are more than ten other private companies who have been issued with exploration licences but have not done much.

In Lesotho, exploration work undertaken was for base metals in the Roma valley basic rocks. Expenditure incurred for this venture was close to M214,900 (US\$38,651.08).

In Malawi, the Geological Survey Department continued with various mineral exploration activities mainly for gold, platinum group metals (PGMs) and other base metals in the Dzalanyama Range, Nkhota Kota-Nkhata Bay and Kirk Range-Lisungwe Valley areas. Most of this exploration is preliminary in nature aimed at generating baseline data for subsequent detailed exploration by the private sector. Several dambos in the Central Region of Malawi were also investigated for Gypsum.

A number of private companies complimented government effort in mineral exploration. These included Zambezi Exploration who are exploring for gold and base metals in Lilongwe and Castle Exploration who are looking for gold, diamond and platinum group metals in Mangochi and Chikwawa districts. However, there are more than ten other private companies who have been issued with exploration licences but have not done much.

In Mozambique, exploration activities being undertaken by private companies have reached an advanced stage and some may commence production within the next 2-3 years. The most promising ones are 3 Heavy mineral sand deposits, 2 gold deposits, 3 Tantalum deposits, bentonite deposits, and one granite quarry.

On the other hand, several individuals and Mozambican enterprises possess mining title areas with geological potential and some of them are setting up joint ventures with foreign investors.

In Namibia exploration work, which is undertaken by both private and public enterprise, continued countrywide mainly for base and rare metals, dimension stone, industrial minerals, nuclear fuels, precious stones and semi-precious stones.

In Swaziland exploration for copper, nickel and gold continues.

In Tanzania, gold exploration has been carried out mostly in the greenstones of the lake Victoria gold fields and the Rukwa Mpanda Mineral Field.

In Zimbabwe, exploration is carried out under Exclusive Prospecting Order (EPO). At the end of the year the area covered by EPOs was 10 690 552 hectares. A notable result of exploration in the year was the announcement of the opening of a new diamond mine.

The cumulative expenditure on exploration for the year 2000 was ZWD226 946 901.

All of the information gained from the various surveys is being captured in databases in each country, at varying stages of development.

### **Beneficiation**

Minerals beneficiation can be described as a four stage value adding process, from the point of producing a saleable ore or concentrate to the final stage of fabricating

or manufacturing a finished product. ( Economic Services, Chamber of Mines of South Africa).

These four stages are summarized as follows.

Table 28. Stages of beneficiation

<b>Stage</b>	<b>Mineral beneficiation process category</b>
1	the action of mining and producing an ore or concentrate (primary product)
2	the action of converting a concentrate into bulk tonnage intermediate product (such as a metal or alloy)
3	the action of further converting that intermediate product into refined products suitable for purchase by both small and sophisticated industries (e.g. semis)
4	the action of manufacturing final products for sale (eg aluminium engine block)

*Source: Chamber of Mines.*

The reasons for beneficiating from stage 1 through to stage 4, may be:

- to increase product value
- to deliver a product through limited infrastructure in lower volumes
- to become a price maker in the market as opposed to a price taker.

A further benefit of increased beneficiation is the opportunity offered for increased levels of employment, both in the beneficiation process and associated secondary industries.

Generally, Southern African mining industries have been dominant in stage 1, and have recently become more prominent in stage 2, but have been relatively absent in stages 3 and 4.

Using South Africa as an example, the degree to which beneficiation has typically occurred is summarized as follows, in terms of “production beneficiation ratio” (PBR), and “export beneficiation ratio” (EBR), where PBR is defined as the ratio of total mass of a commodity in beneficiated form as a percentage of the output of that commodity as a first saleable product, and EBR is the ratio of the mass of a

commodity in beneficiated form expressed as a percentage of the total (both beneficiated and unbeneficiated) export mass of that commodity.

Table 29. Production beneficiation and export beneficiation ratios.

<b>Beneficiation process</b>	<b>PBR (%)</b>	<b>EBR (%)</b>
Antimony concentrate to antimony trioxide	100	100
Chrome ore to chromium alloys	87	84
Copper concentrate to copper metal	89	87
Gold ore to gold bullion	100	100
Iron ore to pig iron and steel	31	22
Manganese ore to manganese metal and alloys	56	48
Nickel matte to nickel metal and sulphate	100	100
Zinc concentrate to zinc metal	87	44

Source: Minerals Bureau.

In all the above cases, beneficiation has progressed to stage 2 or 3, but not to stage 4. The reasons for this lack of progression, which is generally typical of Southern African countries, can be summarized as follows; in terms of business environments that are not conducive to investment in certain areas of minerals beneficiation. Investment in minerals beneficiation projects, just as in any other investment area, are based on adequate risk/reward ratios, commensurate with potential investor expectations. The risks in this regard are financial, technical, marketing and socio-political. These are influenced by the following factors.

- Industrial and trade policies, which may have been influenced by political isolation or interference
- Systems of tariffs and duties which stifle the importation of capital equipment necessary for beneficiation processes
- High costs of capital, especially in countries with high levels of inflation
- Lack of foreign capital inflows into countries with restrictive policies, or political instability
- Tight monetary policies, established to clamp down on capital outflows, curb inflation and preserve balances of payments, especially in countries carrying high levels of foreign debt



- The threat of default on foreign debt
- Spill over of emerging market instability and uncertainty
- Fiscal regimes that do not offer incentives to foreign investment, in terms of favorable tax rates, investment incentives, tax shields etc
- State intervention through expenditures into distorted “strategic” projects, or excessive military spending in Southern African countries.
- Financial and trade sanctions, which have resulted in the encouragement of raw (unbranded) material, as opposed to branded products, and a lack of technology transfer. Countries which have or are experiencing sanctions miss the opportunity of joining the move to establish smoke stack industries in developing countries, as opposed to developed countries.
- Industrial relations uncertainty, often linked to political affiliations, such that industrial action may be sparked as much through political leverage as workplace issues.
- Lack of skilled labour, to deal with new beneficiation processes.
- Colonial legacy issues which have encouraged African countries to be exporters of raw materials to first world countries who have enjoyed the rewards of branding and beneficiation
- Resource endowment (Dutch Disease) which has frequently resulted in a distortion of investment into particular resource industries, especially during periods of high prices (e.g. the gold industry in the 1980’s)
- Stockpiling by industrialized countries of strategic minerals, especially during times of international political or economic instability
- Import parity pricing, which has resulted in domestic suppliers of raw materials charging equivalent import prices plus tariffs, thus making prices prohibitive for local stage 4 entrepreneurs.

These issues can be examined for each of the Southern African countries, and are exemplified by the statistics appearing in section 4 of this report.

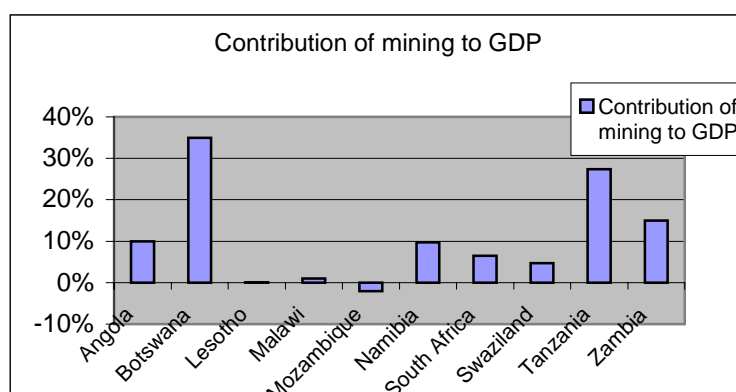


Figure 11. Contribution of mining to GDP. *Source: IFC*

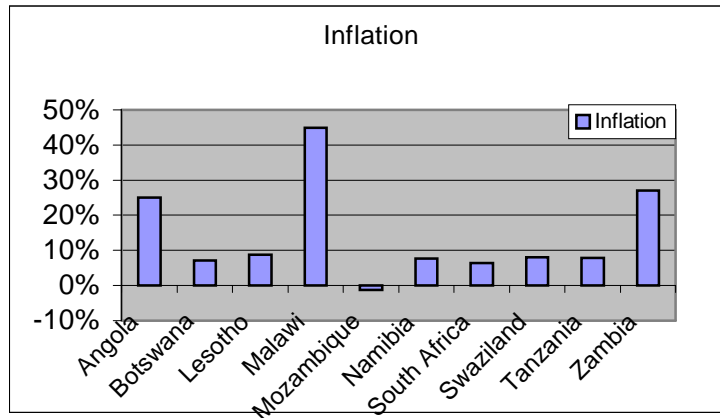


Figure 12. Inflation rates in SADC countries. *Source: IFC*

Using the contribution of mining to GDP and inflation as economic indicators, the graphs illustrate considerable uncertainty, and a picture emerges which is not particularly conducive to the stimulation of downstream beneficiation in several countries. Furthermore, unreliable information has resulted in it being difficult to produce a picture for Zimbabwe and the democratic republic of Congo, both of which are, or could be, significant players in the mining and minerals sector in Southern Africa.

### 5.1. Factors that are supportive of competitive advantage for beneficiation.

The following are areas that are considered to be comparative advantages for investment in minerals beneficiation projects in Southern Africa.

#### a) Resource endowment.

Southern Africa not only is endowed with large resources of primary metals and minerals to be beneficiated, but it also is endowed with many of the products required as ingredients or catalysts in the process, such as refractants, chemicals, fluxes etc..

Furthermore, the presence of metals used for alloy production, for example, are present in abundance.

Whether or not the resource abundance offers comparative advantage or not depends on the pricing mechanism, the useage, the availability of skilled labour, etc.. For example, while the presence of low cost iron or chrome is a distinct advantage to the steel industry locally, such advantage does not exist for gold or platinum.

#### **b) Energy**

Southern Africa has the ability to supply low cost energy through low cost/low grade coal burning, or through hydroelectric schemes such as Kariba, Lesotho Highlands or Cahora Bassa.

Escom for example has the ability to produce electricity at one third to one half the price per kilowatt hour of that supplied by its first world counterparts. Additionally, an extensive grid provides reliable supply, at negotiated flexible electricity pricing strategies.

#### **c) Technology and research**

Southern Africa, mainly through South Africa, has developed technological know-how through research, often through political necessity. This is exemplified through the development of blast furnace technology, coal to oil conversion, nuclear fuels technology etc.. Research organizations established during isolation years, have the ability to provide first world solutions through research and development.

#### **d) Labour availability**

Southern Africa has a large pool of unskilled labour. It also has the potential to develop technical and managerial skills necessary for downstream beneficiation.

#### **e) Transport, infrastructure and location.**

The advantage of reducing the cost of transport to the site of beneficiation becomes apparent when the beneficiation is done close to the mineral producer. This is particularly important in steel associated industries, and industries producing some form of concentrate.

Iron ore, for example, realizes a weight loss of 30 to 40% during conversion to pig iron. Further beneficiation results in the export of relatively low volume, high quality steel products.

#### **f) Location and infrastructure**

An important factor in the attractiveness of beneficiation is the physical location with respect to markets, and the available infrastructure in terms of roads, rail links, ports, electricity etc..

Clearly some Southern African countries have significantly better infrastructure than others, especially South Africa, Zimbabwe, Zambia, Namibia and Botswana.

Overall, the region has the ability to establish networks that can service major markets through Dar es Salaam, Maputo, Richards Bay and Durban in the East, and Saldanha and Luanda in the West.

Upgrading of facilities and networks to take advantage of this situation is necessary, as is the necessity to ensure reasonable and favourable tariffs and charges from the infrastructure suppliers.

These factors, generally indicate that Southern Africa can be a fertile ground for increased beneficiation, and that enhancing infrastructure and services should itself be a stimulus for industry diversification.

#### **5.2. Improvements in minerals beneficiation.**

According to the Chamber of Mines Economic Services (Baxter, 1995), promoting further minerals beneficiation (in South Africa) requires reduction of financial and market risks.

In terms of financial risks, this involves:

- Inflation and domestic price stability, as pre-requisites for long term investment planning. Variations and volatility in inflation rates, fiscal and monetary policy, and government spending throughout the region are not particularly conducive to attracting investment for beneficiation.
- The abolition of exchange controls. Tight or uncertain exchange control regulations result in risks to foreign investors, in terms of repatriation of capital. Within SADC, the establishment of a free trade area is essential to

reduce tariffs, exchange control and other bureaucratic impediments to the free flow of raw materials to beneficiation sites, and export markets.

- Favorable tax rates and incentives for investment are necessary. In South Africa, capital allowances and capital appropriation provide incentives for investment in new mining projects, but this does not extend to beneficiation projects. Such tax structures, which allow earlier cash generation could provide a stimulus for the establishment of beneficiation in Southern Africa.

**Market risks can be addressed by the following.**

- Opening up economies to international competition. This can be done through tariff reduction and trade agreements both within the region and internationally, to allow movement and transfer of capital and technology, to ensure efficiency and to gain advantage from economies of scale generated by access to larger markets, and by increased cooperation within the region.
- Reducing political and social risks. Clearly, the region has not reached the situation where political and social risk is not perceived to be an impediment to investment, as evidenced by the current situation in Zimbabwe. Whether situations like this are solved by diplomacy, common resolve or more direct intervention is not the subject of this report, but stability is an essential ingredient for the success of the region, and increased investment in beneficiation and manufacturing industries.
- Promotion of stage 4 fabrication industries. Dr P Jourdan (1995) identified five possible prices that a stage 4 fabricator could pay for a stage 3 mineral input.

Table 30. Stage 3 beneficiated mineral input costs.

	<b>Stage 3 input price structure</b>	<b>Comparitive cost advantage/disadvantage</b>
1	Import parity with tariff (e.g. LME plus transport plus tariff	Worst case cost disadvantage
2	Import parity without tariff (e.g. LME plus transport	
3	International price (e.g. LME price	
4	Export parity price (e.g. LME less transport	
5	Local mineral cost	Best case cost advantage

*Source: Jourdan, 1995.*

Whilst the most favourable structure would be passing on directly the local mineral cost, this is unlikely in most cases, since the operating companies are usually different, and therefore subject to commercial market prices.

However, arrangements to ensure export parity prices for beneficiators would be favourable.

- Facilitation role of governments. The role of governments should be to create an enabling environment for investment into beneficiation, as opposed to one of direct intervention. This issue is raised in the context of the South African Minerals Development Bill, which tends to prescribe that companies should invest in beneficiation, as opposed to offering incentives in terms of tariff reduction, exchange control reduction, tax relief etc.

### **5.3. Recent developments in beneficiation.**

Despite some of the shortcomings mentioned above, there have been important developments in beneficiation, such as:

- The establishment of the “compact” between Mintek and the South African Department of Minerals and Energy, that aims to:
  - provide greater and more efficient beneficiation to minerals and value-added products within South Africa through competitive and innovative mineral and metal process technology
  - strengthen South Africa’s as a global supplier of mineral commodity processing equipment, machinery, consumables and process design, as well as control optimization systems through the formation of consortia, strategic alliances and joint ventures with industry
  - develop SADC strategies for the mineral beneficiation sector, concentrating on value-addition and capacity-building through mineral based anchor projects
  - develop technologies appropriate to the local artisanal and small-scale mineral processing industry, with the aim of expanding the industry, and the lowering of entry barriers. (Mining Weekly, April 2000).
  
- The move by the Rand Refinery to produce semi-manufactured products such as fine gold, carat alloy grain, plate, rod and wire of varying dimensions, aimed at the local jewelry market
- The establishment of the second line at the Mozal smelter in Mozambique, at a cost of \$830 million, to add to the \$1.3 billion already invested in the project at Maputo. Of interest is the fact that the smelter will consume 900 megawatts of electricity, at internationally competitive prices, negotiated by the Mozambican Transmission Company, which will apply until the end of 2025. This increase in electricity demand will have the effect of bringing forward the Mepanda Uncua hydro-electric development project, thus creating further employment and growth in the services industry.
- Expansion at the Hillside aluminium smelter in Richards Bay, and an R800 million expansion at Hulett’s rolled products plant at Pietermaritzburg, thus forming a cluster of aluminium beneficiation.
- Agreement has been reached on the necessary funding mechanism and structure for the appointment of a Gold Jewelry Transformation Champion to develop the gold jewelry manufacturing sector. Emphasis has been placed

on the necessity of growing an Afro-centric jewelry manufacturing industry, and this is being manifested through the establishment of jewelry design and manufacturing facilities in Johannesburg . Links will shortly be established in West Africa to explore synergies in jewelry design, manufacturing and training, spearheaded by initiatives established by AngloGold.

- Project “AuTEK” has been established jointly between AngloGold, Gold Fields Limited, Mintek and various universities, with the aim of finding alternative downstream and industrial uses for gold, specifically in the manufacture of fuel cells.
- The establishment of a magnesium solution mine in the Republic of Congo, with the requirement to establish a 120MW power facility at a cost of \$300 million.
- The establishment of the Zincor zinc refinery, to process the regions increasing zinc production, and thus create a regional, globally competitive zinc cluster.

#### **5.4. Mineral Processing Programmes**

In the area of mineral processing the following projects have been identified.

Apart from the modest processing of diamond, industrial minerals for ceramics, bricks, dimension stones, no significant processing facilities are available in Angola. However, many mining and exploration companies are engaged in mineral development in the country are equipped with facilities to process the mined ore in order to extract and recover the minerals of interest. Mineral commodities which are mined in the country, of which the processing plants are on site, include diamonds, cement, and industrial minerals

Apart from the modest processing of industrial minerals for ceramics, bricks, tiles and dimension stone, no significant mineral processing facilities are available in Lesotho.

A bentonite beneficiation and milling plant and a soda activation plant exists at the mine near Boane, South of Maputo.



In Namibia, the construction of a new solvent extraction and electro-winning plant with a capacity of 150 000 tonnes per annum at the Skorpion Mine was approved and in another development Rossing Uranium commenced the construction of a pilot ore sorting plant.

Except for the processing of industrial mineral for local manufacture and use, few facilities are available in Swaziland. Brick and talc production are the only mineral based industries at present.

In Tanzania, there are plans to invest in the Iron and Steel Sector. A detailed proposal has been done to carry out a systematic pre-feasibility study of the potential for a mine and an iron and steel complex of the Liganga Iron Ore deposits located in Iringa, Southern Tanzania.

In Zambia Chambishi Metals Cobalt slag processing Plant will produce about 4,400 tonnes of finished copper and 3000 tonnes of finished cobalt, while Chibuluma is to produce about 15000 tonnes of finished copper.

RAMCZ leaching and Electrowinning plant will process the oxide ores from the opencast mines.

Zimbabwe's Department of Metallurgy is currently focusing on upgrading tantalite ores and separating tin from tantalite/tin concentrates.

Capacity for copper smelting and refinery exist at Alaska Copper Smelter and Refinery owned by Zimbabwe mining Development Corporation. The smelter processes concentrates from South Africa and the Democratic Republic of Congo.

Mineral Processing laboratories are at the Department of Metallurgy and the Institute of Mining Research.

Empress nickel refinery is treating matte from Botswana and Zimasco is sending PGM concentrates to South Africa for treatment.

## **6.0 Globalisation.**

Global business involves all those commercial activities between two or more countries. These commercial activities may be undertaken by private companies with a view to profit making, or by government organizations, in which there is generally no profit motive. (International Business:environments and operations). Global commercial activities are defined as the movement of resources, goods, services and skills over international borders.

This resultant international business is influenced by the objectives of international enterprises, and affects the business environment.

The move towards the globalisation of business has been influenced by:

- Technological renewal
- The rediscovery of capitalism
- The development of the services industry
- The development of regional trading blocks (such as the SADC or COMESA)
- Increasing ties between different economies
- The dominance of the USA as economic force in the world
- The unstable international political climate
- Changing demographic patterns and the impact of AIDS
- Outsourcing
- Privatization
- Changing value systems.

These influences are of such a nature and magnitude that globalisation is unstoppable, and sustained economic growth can only be achieved against this background if firms and governments think globally.

The Southern African region is emerging as one of potential importance for foreign investors, given its endowment of natural resources, and given positive changes recently in terms of reductions of the role of the States in economies, and relaxations in foreign exchange regulations.

However, there is a long way to go for Southern Africa in the race for foreign capital: the SADC for example attracted an average of \$90 million in investment per country, compared with New Zealand (\$2.5 billion), Hungary (\$4.5 billion) and Singapore ( \$7 billion), in 1995.

With a combined GDP of \$150 billion, SADC represents an important emerging market, in which industries must be globally competitive.

Supportive of the conclusion that SADC is an important emerging market has been:

- Moves towards political stability, peace and security
- Transformation to market-based economies
- Endowment of natural resources
- Reasonable infrastructure, on average
- Development of the capital and money markets.

Globalisation has manifested itself in a growth in world trade, unification of capital markets, internationalization of production and distribution networks and a revolution in information, communications and technology.

Against this background, SADC has limited itself largely to the export of primary commodities into these markets. Although volume of trade has increased, value has decreased, it being added predominantly in trading countries who have invested capital in the downstream value addition of the exported products. SADC has therefore found itself in a disadvantaged position.

It therefore needs structures and policies to transform productive capacity into manufactured products for export. Multi national companies have a role to play in this regard, in that their diversification geographically provides them with a platform to influence the global marketplace, to the advantage of the region. Iscor, for example has identified that its international expansion programme produces strategic advantage for the company in terms of economy of scale benefits, balancing of tax benefits from various locations, reduction of labour costs, protection of home market, and social responsibility to Southern Africa, all of which are aimed at establishing returns on investment which can be utilized for reinvestment into corporate expansion and social investment.

A precursor for globalisation is regional integration. This was recognized at the Declaration and Treaty established in 1992 to establish SADC, whereby integration can realize:

Economies of scale, reduced tariff levels, larger markets

Regional competition, spurring on new technology development

Furthermore, a survey was conducted under the auspices of the Investment Promotion Agencies, to identify the eight major strategic issues facing leaders in Southern African

countries. This appeared as follows, in terms of the importance placed upon each by the respondents.

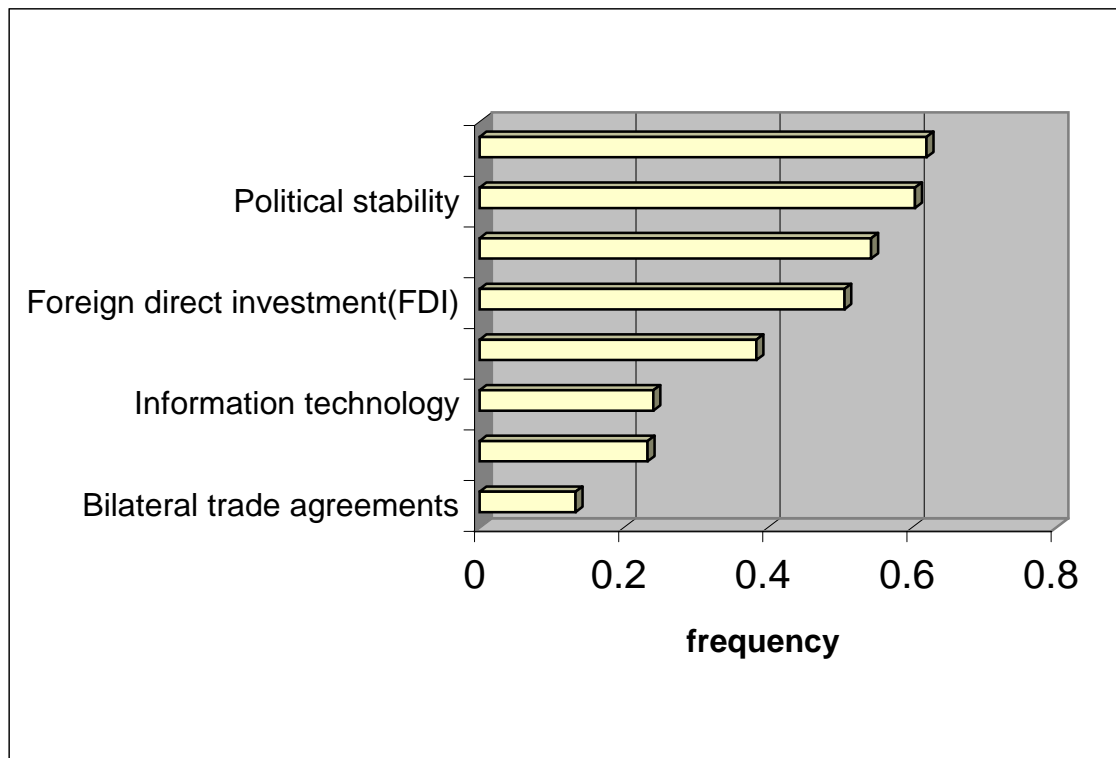


Figure 13 Strategic issues facing leaders in Southern African countries.

Amongst these issues identified, has been that of foreign direct investment (FDI), and a similar study revealed the following as being the key factors which affect FDI flows into Southern African countries.

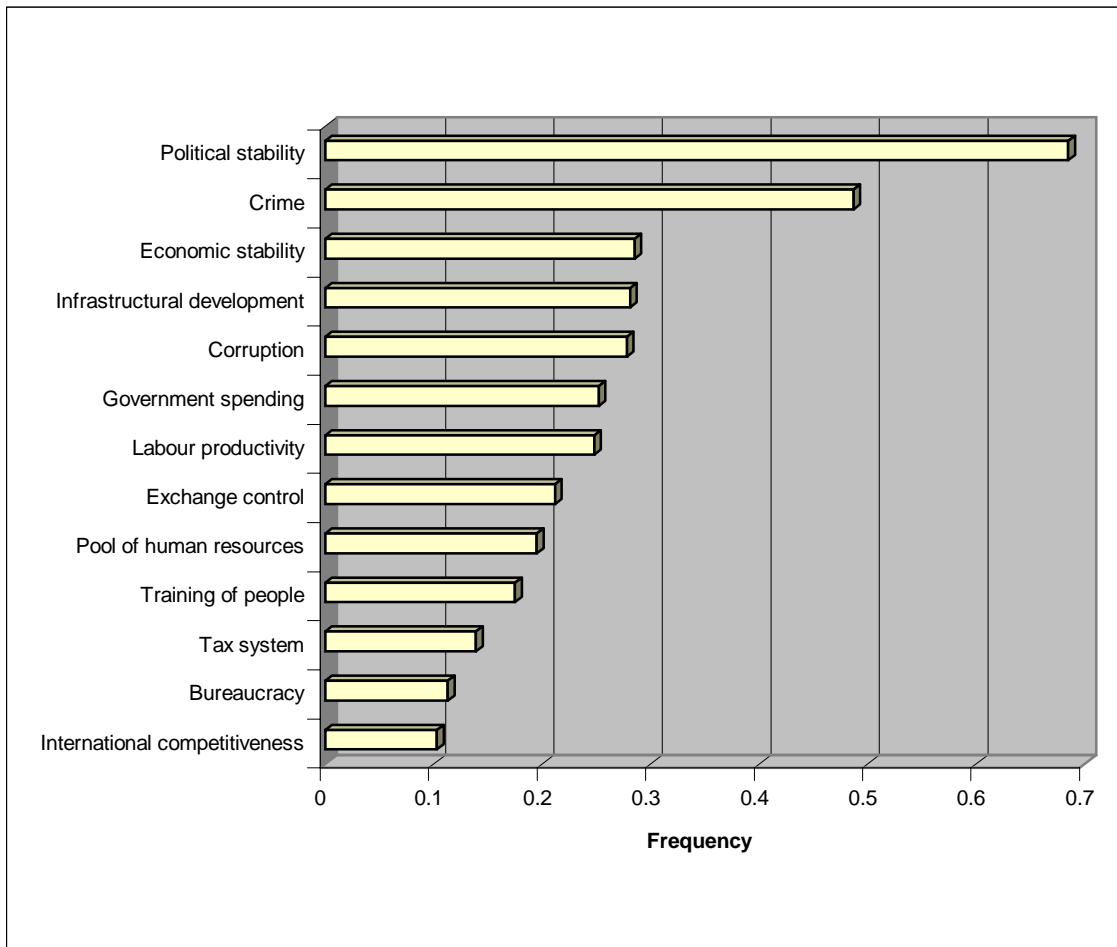


Figure 14 Key factors affecting FDI flows into Southern African countries. *Source: Global Business.*

Examination of these key factors against the country analyses which appear earlier in this report, indicate a wide dichotomy between countries of the region.

Although major companies have embraced globalisation, if regionalisation is a precursor to globalisation, individual governments have some way to go before the SADC becomes a credible and influential global trading region.

It is recommended that a strategy for globalisation be developed based on critical self examination of these indicators. A recent article in Mail and Guardian (15 June 2001) reflected that :

“Not only in the field of health care, but also in the broader aspects of regional economy, the need for coordination and integration, at present elusive, was evident. There remain far

too many barriers to trade and business activities in the region, and currency volatility is relatively high.

...Economies of scale and scope suggest an integrated Southern African Development Community (SADC) economy would offer a large market, more viable business opportunities, a superior investment environment and a complimentary industrial and sectoral mix conducive to higher levels of job creation.

Regional problems – persistent instability, civil wars, general vulnerability of human resources – are clearly not insurmountable, yet they require decisive and coordinated leadership and solutions, something the SADC in its current configuration has proved unable to deal with.

The history of the SADC may offer much explanation for its current state of tardiness towards integration. This places South Africa in an invidious position. Given the relative size and sophistication of its economy, South Africa should take the lead in economic integration, yet it remains wary of being accused of arrogance and heavy-handedness.

The emergence of regional economies is a defining feature of economic globalisation, making the SADC's procrastination in accelerating integration costly. To this end it was agreed ( at the World Economic Forum meeting in Durban) that a consistent and sustainable framework needs to be put in place – significantly, with clear criteria for membership. Common global prerequisites for successful regional integration include coordinated fiscal, monetary and foreign exchange regimes, as well as compliance with democratic and accountable governance”.

Multinational mining companies have managed to cross boundaries within the region, in order to become globally competitive from a Southern African base, with limited success. Anglo American, Metorex and Avmin have established operations in Zambia, subsequent to privatization of the copper industry, but only after protracted negotiations with the government on issues ranging from ownership to fiscal policy to expatriate conditions. De Beers currently finds itself in protracted negotiations with the Angolan government over the sale of diamonds, which threaten the viability of new ventures in that country.

If the minerals industry is to contribute its full potential to the sustainable development of a globally competitive SADC minerals industry, regional policies and practices must have some degree of common direction and purpose, so that multinational companies can continue to support the industry, through direct investment, and through the establishment of joint ventures with Governments, local entrepreneurs and the small mining sector.

## ***7.0 Dutch Disease***

Dutch disease is name applied to the phenomenon experienced by countries which have a rich endowment of minerals, the result of which is that the economy of the country becomes heavily reliant upon the revenues received from mineral sales, at the expense of the growth of other industries.

Frequently, large government revenues are realized, raised either through direct involvement or ownership, or through mineral rents, and these revenues then become expended on non-value creating activities, such as social spending or military spending. The fact that this revenue is not reinvested into creating a viable manufacturing sector, or downstream beneficiation industry, results in a booming minerals sector (which is unsustainable because it is based on a wasting asset) coexisting with a lagging or shrinking manufacturing sector. The effects that arise include the following.

### **1. The spending effect.**

In this case revenues generated in the economy, which flow to the State, are spent on non traded goods and services, as opposed to those being invested in those sectors which would diversify the economy, and ensure its sustainability.

Such a situation existed in South Africa, during the periods of isolation, when in 1979/80, military spending accounted for 16% of government spending, at a time when taxation from mining was at a high rate, reaching a record 28.48% of government tax revenue in 1981 (van Blerk).

Currently, such a risk exists in war torn countries, where the issue of conflict diamonds is indicative of the desire by countries to use mineral wealth to fuel military or political action, or to use it as a rationale for occupancy of neighbouring territories.

Clearly, such action reduces the long term ability of mineral endowment to contribute to sustainable economic success.

## **2. The resource movement effect.**

This effect refers to the movement of resources – people, money, equipment, technology- into the successful minerals industry, at the expense of other sectors. The successful industry draws funds and expertise, as a result of the gains to be had, and the low risks associated with the flourishing industry. The result is a “brain drain” from other sectors, with the effect that advancement of these sectors is stifled. Frequently, other resource based industries suffer from this effect, notably agriculture, which is unable to compete for labour, given the attraction of high wages in the minerals sector.

## **3. The currency appreciation effect.**

Minerals and metals traded on international markets, in international currency, place local currency in demand, with the result that the value of the currency appreciates.

Whilst balances of payments and foreign exchange reserves are enhanced, imported goods and services become expensive. Whilst this may not be a problem for the minerals industry itself, the effect upon emergent manufacturing or other businesses is detrimental, and may be prohibitive to establishment.

**In fact, this effect may result in driving beneficiation offshore, thus having a further negative effect.**

## **4. The technology substitution effect.**

Once the minerals industry is in full production, and creating revenue, there is no need for the development and improvement of technology. This lack of development not only means that potential technology suppliers do not enter the market, but this may have a further effect that technology development that could be transferred to other industries, is not developed.

## **5. The enclave effect.**

This effect is realized when there is no investment in beneficiation, because sufficient revenue is realized from the export of raw product. This is further enhanced where perceived market expertise for downstream activity is in short supply, but is available at traditional sites elsewhere.

First world and industrialized countries have favoured the importation of raw materials, from “colonial” suppliers, in order to support their own industries. This legacy effect has had a



negative effect on downstreaming in developing countries, but moves away from traditional “smokestack” industries in first world countries opens an opportunity for third world and emerging countries to enter this market.

A discussion with an executive of a large mining company recently revealed that a further effect, often prevalent in African countries is that of corruption, encouraged by the opportunities at underhandedness of issuing permissions and conditions. This is borne out by the World Bank/IMF findings, which ranked Sub Saharan Africa as being above the World average in terms of corruption, with low growth countries being particularly bad (IMF International Country Risk Guide).

The same commentator observed that since the development of the minerals industry in Mali, being previously ranked as the poorest country in Africa, the previously dominant industry (cotton growing) has all but disappeared, as labour and capital moves to the mines.

Most of these effects are evident in the SADC region, often as a result of legacy issues. Globalisation offers an opportunity, through regionalisation and the input of multinational companies, to establish downstream beneficiation and secondary industries in the areas of infrastructure development, manufacturing, technology, services, commerce and distribution.

Such an opportunity can be realised through economic diversification on a regional basis, which encourages downstream beneficiation, small enterprise development, the establishment of an enterprise development strategy, and a policy environment conducive to establishing a balanced and diversified economy, based on participation of government, NGOs, multinationals and small business enterprises.

Issues to be included are :

- Establishment of appropriate foreign input (in terms of funding, expertise and trade agreements) balanced with domestic output
- Incentives to invest in diverse economic and value adding enterprises
- Development of adequate skills
- Access to capital, and ability to produce bankable studies
- Development or transfer of appropriate technology, internationally
- Development of information bases on markets, demands etc

Unfortunately, the SADC starts from a position where it has, to a large degree, to play “catch-up” in beneficiation. Also, although there have been favourable developments in countries such as South Africa which would indicate that the problem of Dutch disease is diminishing, this is not the case in countries such as Angola and the Democratic Republic of Congo.

Regional initiatives could include a degree of **protectionism** within the region, to encourage small enterprise development, and gain the advantage of free trade, tariff protection etc.. Such could be a temporary measure, aimed at being gradually lifted as the development of diverse economies progresses.

## ***8.0 South Africa : a case study.***

As a result of the availability of information, South Africa provides a useful case study for many of the issues raised.

### **8.1 South Africa’s role in mineral production.**

South Africa, as result of its rich endowment of mineral resources, associated with the geological formations of the Witwatersrand, Transvaal and Karoo supergroups, the Bushveld igneous complex, the kimberlite intrusions, the metamorphic terrains, the greenstone belts and the sedimentary carbonaceous deposits, has had a thriving mining industry for well over a hundred years.

Changes in world markets, as a result of changing economic trends, and new technologies, coupled with the exploitation of finite resources has resulted in significant changes in both the composition of the industry, as well as its volume and contribution to GDP.

The number of operating mines and quarries, for example, as illustrated in figure 15 , has declined from a peak of nearly 100 in 1989, to some 750 currently. This has been partly due to consolidation, but also to closure of operations which have been unable to deal with margin squeezes, or which have depleted their mineral resources.

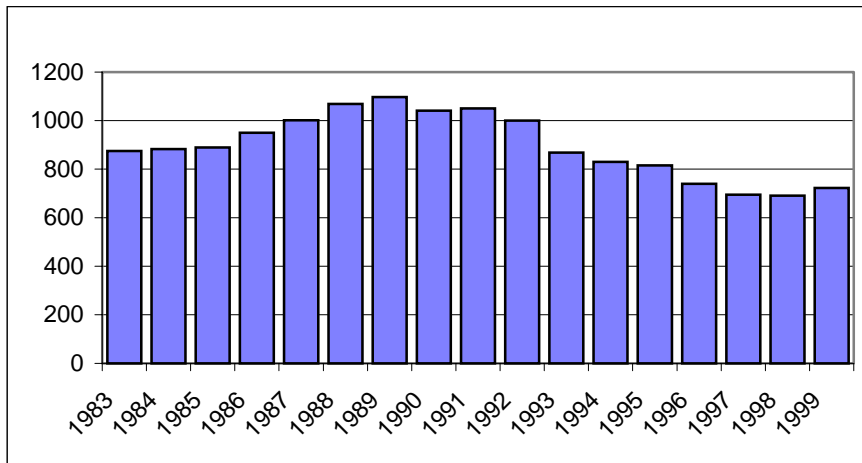


Figure 15 Number of operating mines and quarries.

Source: South Africa's Mineral Industry (SAMI) 1983-1999.

## 8.2 Mineral Resources, Production and Exports

South Africa holds the world's largest reserves of manganese, chromium, PGM's, vanadium, gold, and alumino-silicates. It is also a leading holder of reserves of fluor spar, phosphate, titanium, vermiculite, and zirconium (Figure 16 ).

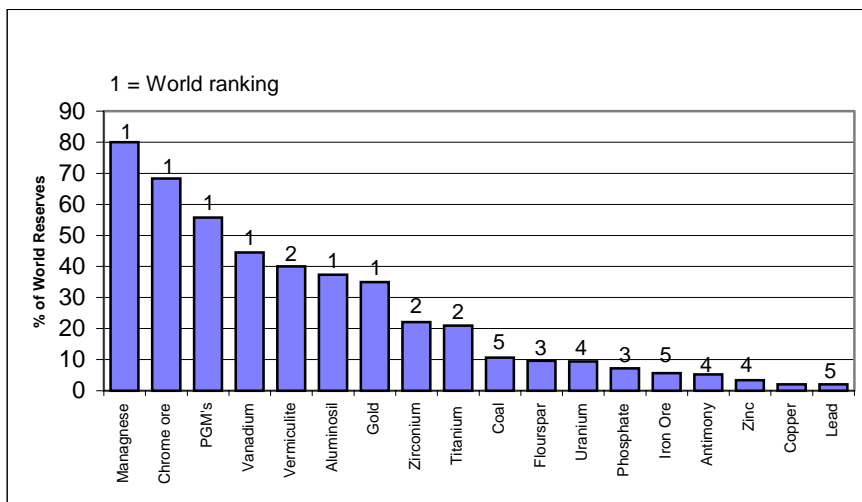


Figure 16 South Africa's role in mineral resources

Source: South Africa's Mineral Industry (SAMI) 1983-1999.

South Africa is the leading supplier providing in excess of 40% of world mineral production for alumino-silicates, chrome ore, vanadium, and vermiculite. It is also the leading supplier of gold contributing 20% of world gold production (Figure 17).

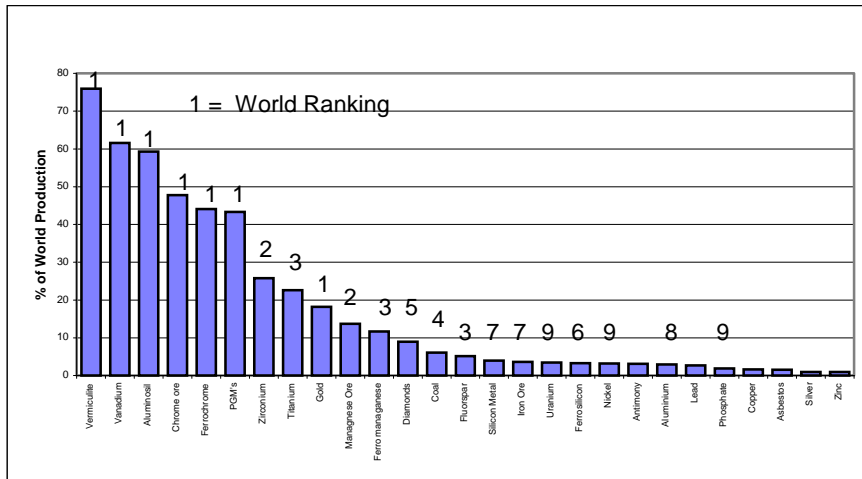


Figure 17 South Africa's role in mineral production

Source: South Africa's Mineral Industry (SAMI) 1983-1999.

The relatively small domestic market for most mineral commodities means that the industry is export orientated, being the worlds largest exporter of gold, vermiculite, vanadium, alumino-silicates, ferrochrome, ferromanganese, manganese and chrome ores (Figure 18 ). This market of raw materials provides significant levels of foreign exchange, as illustrated below, but is indicative of the low level of beneficiation of the raw material within the country's borders. Most export markets have traditionally been first world or industrialized economies, with little export being to countries within the SADC or COMESA region. In this regard, increased beneficiation capability would have the effect of adding value to exports, as well as lowering costs of primary minerals for export, where some 60% of cost of sales of minerals such as manganese or fluorspar, are transport costs.

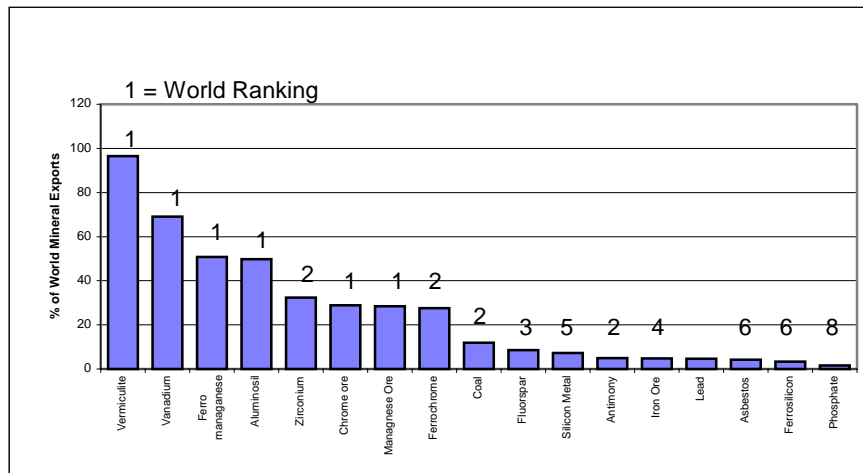


Figure 18 South Africa's role in world mineral exports  
 Source: South Africa's Mineral Industry (SAMI) 1983-1999.

### 8.3. Contribution to Gross Domestic Product (GDP)

The contribution of mining to South Africa's GDP is a measure of the sector's importance to the economic well being of the country. Over the past seventeen years mining's contribution to GDP (as shown in Figure 19), rose to a peak of 15.6 per cent in 1986, but has since fallen steadily and currently (1999) stands at about 6.5 per cent of GDP. This decline is due to growth in the secondary (mainly manufacturing) and tertiary sectors of the economy and the contraction of the gold mining industry in particular.

If the contribution of beneficiated minerals (that is reported in the manufacturing sector GDP) is added to that of mining the impact on the national accounts is significantly higher.

A minerals based economy is defined as one that contributes more than 8 per cent to GDP and whose revenue from mineral exports is greater than 40 per cent. From Figure 19 it can be seen that South Africa's status as a minerals based economy changed in the early 1990's as the contribution from manufacturing has grown.

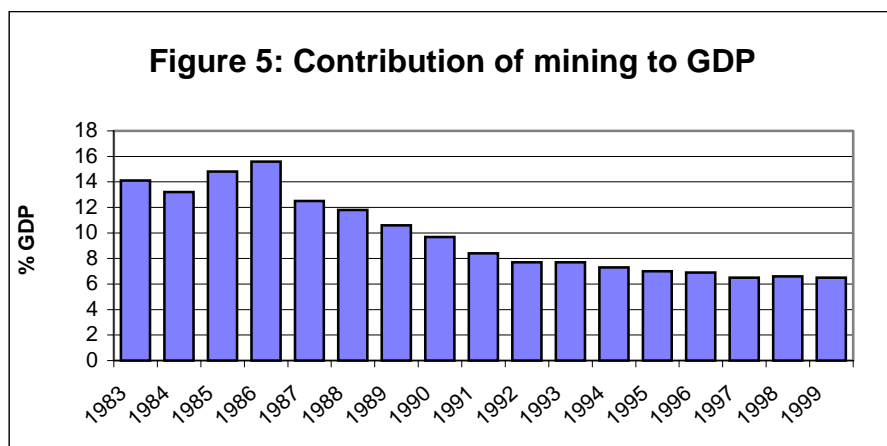


Figure 19 Contribution of mining to GDP

Source: South Africa's Mineral Industry (SAMI) 1983-1999.

#### 8.4 Contribution to Gross Domestic Fixed Investment (GDFI)

Mining's contribution to GDFI over the past seventeen years has followed much the same trend as that of GDP except at a slightly higher level, with the current (1999) contribution to GDFI being about 8.9 per cent. The overall contribution of mining to State Revenue has declined from 4.4 per cent in 1990 to 1.2 per cent in 1999. State aid to marginal mines and pumping schemes has fallen to approximately R 30 000 while mining taxation and total revenue have increased from their low position in 1993 to levels of about R 2.1 M and R 2.2 M, respectively.

Figure 20 illustrates the decline in revenue accrued to the state from taxation, over the period 1913 to the present. This of course is due not only to a shift in revenue creation from the mining sector to other sectors, but also includes effects of changing fiscal regimes and tax rates..

The government of South Africa applies a formula tax to gold mining, aimed at encouraging investment, by allowing capital to be written off in the year in which it incurred, against tax, and by providing further capital allowances.

Despite these effects, the decrease in revenues to the state is significant.

In terms of “Dutch Disease”, this would tend to indicate that a heavy reliance on the Minerals industry in the 1940s and 1950s has been replaced by a more evenly spread tax income.

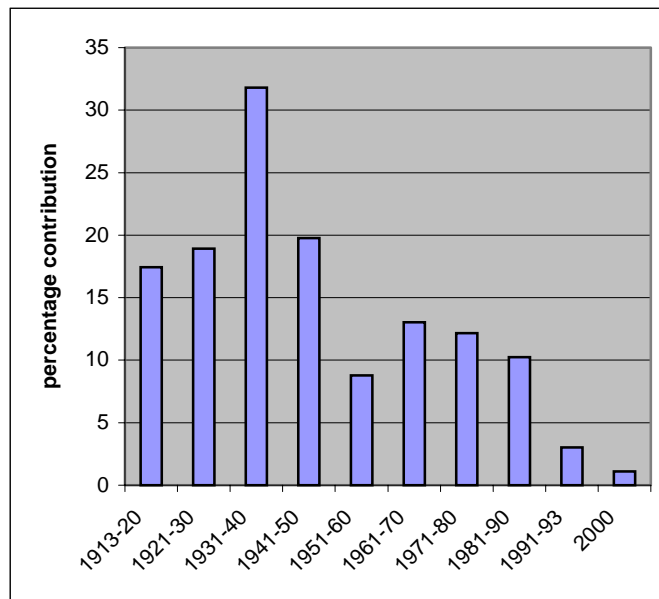


Figure20 Contribution of mining to State Revenue

Source : Van Blerk

### 8.5 Mineral sales.

Although the Rand value of mineral sales over the period 1983-2000 has increased, this is largely due to the effects of inflation.

The contribution of gold to export mineral sales has fallen from about 52 per cent in 1983 to about 15 per cent in 1999 as shown in Figure 21.

The contribution of mineral exports to the value of total exports from the Republic was 33.5 per cent in 1999, but it has also shown a declining trend over the past 17 years (Figure 22). This is due to weakening mineral prices in general and contraction of the contribution from the gold mining industry, which is contributing less in terms of volume produced, and price received..

Again it should be noted that the sales contribution of value-added mineral products such as aluminum, ferroalloys and steels is accounted for under manufactures rather than minerals. Had their value been added to the contribution from mineral sales this sector could have been some 6.5 per cent higher in 1999.

Although the importance of the minerals sector to the local economy may have declined, the global competitiveness of the South African mineral industry has however been maintained through a combined government and Reserve Bank policy of allowing the exchange rate to float downwards against foreign currencies. This means that mineral industry receipts have increased, as mineral commodities have become progressively cheaper for foreign buyers. The impact of globalisation has meant increased exposure for some commodity markets that have come under threat from other producers. South Africa's considerably lower commodity prices have however provided substantial protection against erosion of market share.

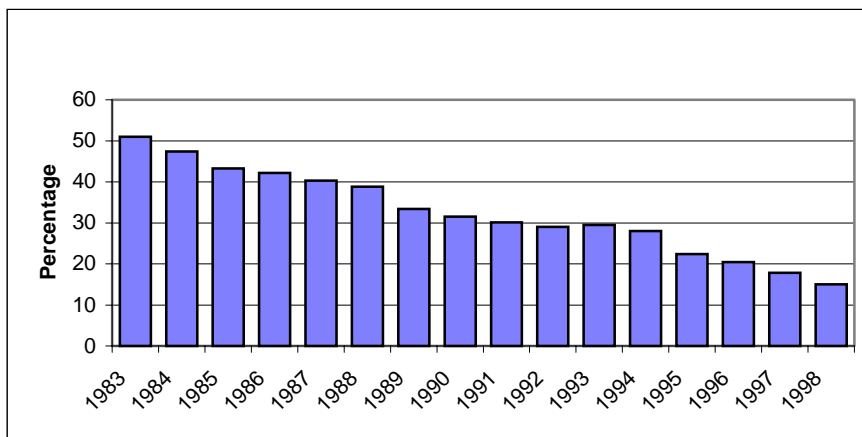


Figure 21 Percentage of gold in total exports

Source: South Africa's Mineral Industry (SAMI) 1983-1999.

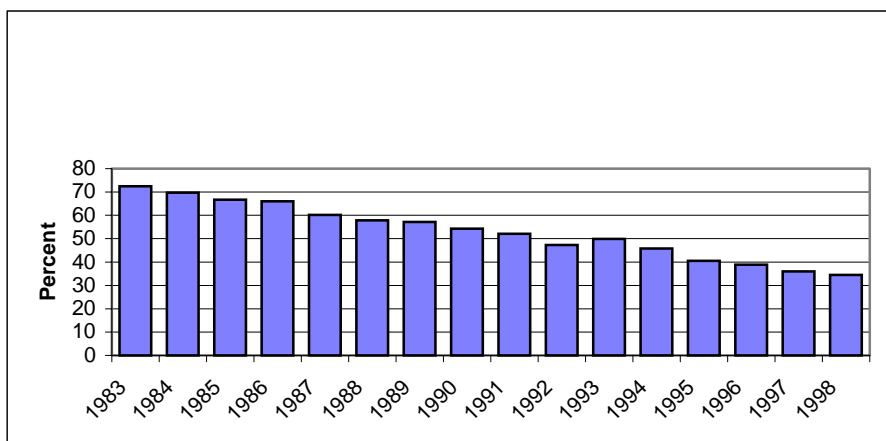


Figure 22 Mineral exports as a percentage of total exports

Source: South Africa's Mineral Industry (SAMI) 1983-1999.



The value of local mineral sales has increased steadily over the 17 years (Figure 23) and clearly indicates a growing use of mineral products within the country. This is largely a reflection of growing value-added uses and increased manufacturing by local fabricators.

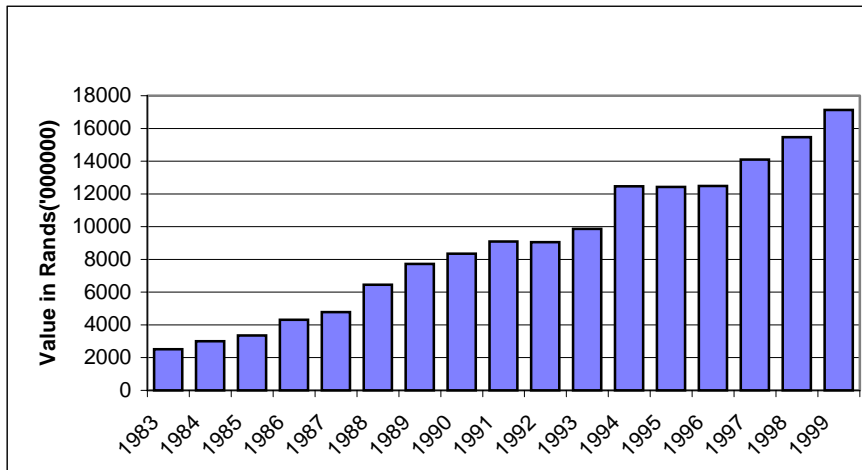


Figure 23 Domestic mineral sales

Source: South Africa's Mineral Industry (SAMI) 1983-1999.

### 8.6 Nature of competition in the sector

Competition in the minerals industry has involved four main areas, namely the acquisition of prospective mineral properties, acquisition of information regarding mineral properties, the employment of new technologies at the metallurgical stages and competition for new or increased market share.

The ability to acquire, add value and trade prospective mineral properties is the business domain of several entrepreneurial mining companies. These companies are aware of the significant value that can be extracted from a mineral property by adding value without developing it. This has been an activity closely watched and guarded by the larger mining corporations who have viewed their mineral rights holdings as their “stock in trade” and have through appropriate timing and necessary information effectively kept the most significant ground within the stable of the “big six”, the latter referring to the six large corporations that dominated the South African mining industry up to the 1990's. The ability of the larger corporations to keep small competitors out of the market has been clearly demonstrated and reflects a deeply protective and competitive attitude within the minerals industry. The

recently released Minerals Development Draft Bill (2001) addresses these issues and seeks to ensure that access to mineral properties is open to all who wish to be meaningfully involved in the minerals industry.

Positive information regarding the prospectivity of a mineral property is the most significant and easiest way to add-value to such a property. As a consequence mineral property information has value and forms the basis for trade and market competition. Even when there is no expenditure on acquiring information value can be added to property if drilling on an adjacent property proves successful.

Employment of new technologies at the metallurgical stage forms the basis for on-going research at institutions such as the CSIR Miningtek and Mintek. Many of these processes are patented and sold to a variety of mineral producers.

The manganese market is a relevant example of competition for market share. Current consumption of manganese is directly related to the global levels of steel production, there being little or no additional use for manganese outside the steel industry. Any further increase in manganese supply could severely influence the fragile market and could lead to a lowering of price by current producers in order to keep new entrants out of the market.

### **8.7. Employment**

During 1999 the mining industry employed 437 000 people which is about 2.7 % of the South Africa's economically active population, approximately 9% of the labour employed in the in the formal non-agricultural sector of the economy. Employment in the mining sector reached a peak in 1986 when 833000 persons were employed (Figure 10). This means that in the 13 years since 1986 about 396000 jobs have been lost in this sector of the economy. Taking the fact that one job in the mining industry can affect the livelihood of 10 dependants, job losses over this period have probably affected in the order of 4 million people. One should note however that in the period from 1983 to 1999 the total wage bill has risen from R 3.6 M to R 20 M (Figure 24). In addition since 1990 the real annual wage per worker has risen from about R 34 000 to R 46 000.

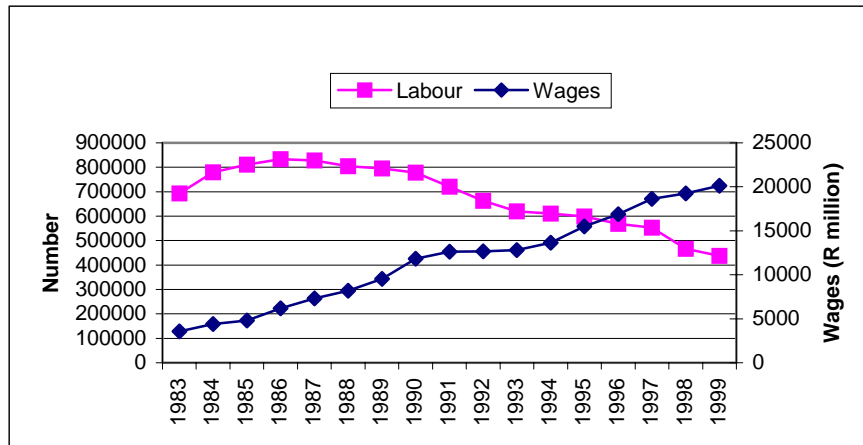


Figure 24 Employment and wages in the mining sector

Source: *South Africa's Mineral Industry (SAMI) 1983-1999*.

The distribution of employment in the provinces is however lopsided. 84.1 per cent of the mining work-force is employed in the four provinces North–West, Gauteng, the Free State and Mpumalanga, and these earned 80.8 per cent of the remuneration. However as the number of people employed in the industry has fallen there has been a consistent increase in productivity of the labour force.

### 8.8 Corporate restructuring

The private sector has seen significant change in the past five years. Corporate restructuring has seen smaller, focussed, commodity specific mining companies replace the old order mining houses. Mining houses have unbundled their holdings, shed their non-core and industrial interests, and have globalised their reach and interests through international mergers or acquisitions of foreign companies. Other transformations have included consolidation of ownership through minority buyouts, transfer of primary listings and corporate head offices offshore and the purchase of South African assets by foreign resource companies.

Corporate activity in 1999 included the transfer of Anglo American Plc from Johannesburg to London, the merger of Gold Fields Limited with Driefontein and Harmony's acquisition of Kalgold and Randfontein. Metorex has emerged as a diversified junior base metal company through consolidation of the assets of Miranda and Consolidated Murchison.

Local junior mining companies particularly those with black participation such as African Rainbow Minerals, have move into the spotlight.

Numerous smaller companies also carry out mining and mineral beneficiation activities creating employment and exploiting the relatively smaller mineral deposits. The National Small-scale Mining Development Framework established in 1999, provides a mechanism to assist, first-time entrepreneurs entering the industry.

### **8.9 . Unbundling and the emergence of black empowerment**

A further trend worth noting is the changing face of the South African minerals industry. The process of change was initiated in 1990 when Barlow Rand unbundled into industrial, coal and gold divisions and Randgold emerged. In 1993 Sankorp unbundled Gencor who sold off the industrial sector Malbak and then focused on minerals through the purchase of Billiton from Royal Dutch Shell in 1994. By the end of 1998 Gold Fields of SA Ltd was in the final stages of dismantling. The new Gold Fields Limited consists of the old GFSA gold mines combined with those of Gencor. JCI virtually imploded after a short attempt at black empowerment. Anglovaal divested itself of the industrial holdings and reorganized itself into Avmin and Avgold. The overall effect was rapid and asset swapping, destruction of corporate cultures, dismantling of white job security and mounting retrenchments (South African Minerals Review 1998-1999).

Anglo American restructured itself into a number of subsidiaries, of which it remains the majority shareholder. This move was aimed at creating focused resource companies, while simplifying the Corporate structure prior to listing on the London Stock Exchange.

Several companies have undertaken offshore listings, on the premise that this gives them access to foreign capital markets, which enhance their ability to undertake international acquisitions, and remain globally competitive.

Control over the industry is now globalised as ownership of the mineral assets has gradually changed hands and now resides with new owners in London, Switzerland, Vancouver and other places. In 1975 mining companies based in South Africa controlled 22% of the total value of minerals production in the western world. In 1985 the figure was still almost 20%, but by 1995 it had dropped to 13%. The initial drop was a reflection of the increase in gold production outside South Africa. However between 1995 and 1999 South

African control of the value of all non-fuel minerals had dropped to only 5%. The consequence of these changes on the national economy, employment and is as yet unclear. Decisions by foreign investors, such as Placer Dome, to take positions in South African mining operations suggests confidence in the long term economic development and political stability of the country. Apart from some mild protest from the trade unions there has been surprisingly little opposition to companies leaving South Africa (South African Minerals Review 1998-1999).

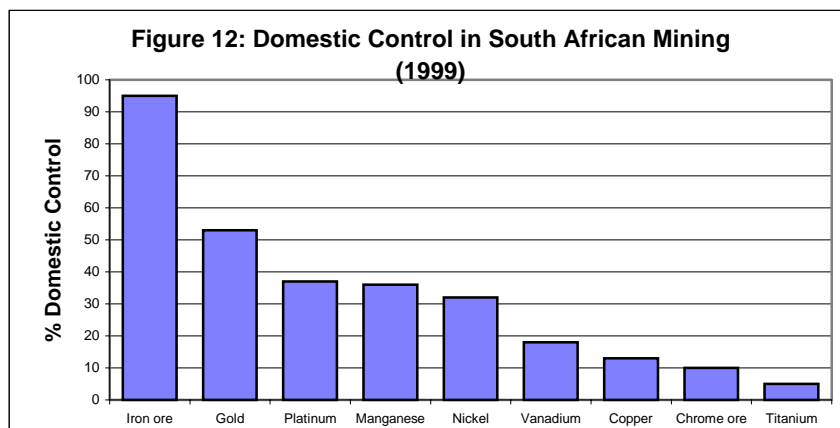


Figure 25 Domestic control in South African mining

Source: South Africa's Mineral Industry (SAMI) 1983-1999.

### 8.10 New entrants to the minerals industry

The last few years have seen a number of new entrants into the minerals industry, as juniors and black empowerment groups, participating in joint ventures or operating as independent companies.

Much of the Minerals Development Bill is aimed at encouraging such entrants through access to mineral rights, but a large problem has been access to finance, which still remains a problem.

There have been some failures, which have been the result of inadequate governance, or inadequate finance, or in some cases the acquisition of resources that were not really viable from the start.

Over 30 foreign companies of variable size have entered South Africa in search of diamonds with the following companies representing the spread of new and emerging participants in the industry (South African Minerals Review 1998-1999).

Noble Minerals listed in June 1999 to exploit Storm manganese and the Refentse project, a small alluvial diamond mining operation.

Thabex Exploration listed in 1997 and raised R 3 M to explore diamond projects in the Barkley West area, but failed and merged with the Canadian company Pure Gold. This company has been more successful at exploring alluvial diamonds in the North West Province.

Gem Diamond Mining Company came to the JSE in 1998 raising R 150 M to develop diamond-bearing gravels along the Orange River.

Mazal Mining and Exploration listed on the JSE in 1999 with about 20% of shares being held by a black empowerment group Thuo Investment Holdings (Pty) Ltd. The company has spent R 12 M exploring a 28-hectare kimberlite pipe on the farm Paardeberg East where preliminary mining has commenced.

Newco is a new black empowerment venture set up by De Beers to exploit the exceptionally rich diamondiferous kimberlite at the Klipspringer mine. De Beers, New Diamond Corporation (controlled by Kwezi Mining, Letlotlo and African Renaissance) and three other black groups Domba, Umnotho we Sizwe and Vuwani as well as a trust will hold varying control over the deposit.

New Mining Corporation chaired by Dr Wiseman Nkuhlu, entered the diamond mining business in mid-1999.

Mvelaphanda Diamonds (MPD) owns 34% of Gem Diamond Mining Corporation. A joint venture between Trans-Hex and MPD owns 28% of Canadian Diamond Field International and MPD could potentially see a further acquisition following a merger between Namco and ODM.

Nabera is based at Alexkor the former State Alluvial Diggings was operated by a contract mining company Mmakau Mining.

Mmakau Mining subsequently withdrew and has entered the coal market.

Only two significant black empowerment groups are known to be operating gold mines: African Rainbow Minerals and Petmin, a small consortium of mining contractors

The following successful coal mining operations have been established:

Kuyasa Mining formed in 1996 by a group of black mining engineers from Ingwe Coal. Now operates the Ikhwezi Colliery near Delmas.

Sebenza Mining a 70/30 joint venture between Sebenza and Anglo Coal produces coal from the Phakama Colliery south of Kriel.

NewCoal a black empowerment company established by Anglo and Ingwe will acquire a share in the Richards Bay Coal Terminal and have an 800 kt export entitlement. Three consortia namely Eyesizwe Mining, Ilanga Mining and Sebenza Consortium have been selected to bid for NewCoal.

### **8.11 Other issues facing the minerals industry**

The application of advanced technology in deep-level mining, manufacturing capabilities in minerals related industries, for mining equipment, processing plants and beneficiation are being investigated through a variety of institutions and vehicles. There is a large pool of mainly unskilled labour for which Government is pursuing ways to enhance the levels of education, training and improved productivity.

Other significance issues facing the South African minerals industry include developments in the diamond industry in regard to the role of the Government Diamond Valuator and the availability of unpolished diamonds to the local industry. The crisis surrounding the gold price and the establishment of the Gold Crisis Committee that addresses issues in regard to down scaling of the gold mining industry, loss of employment and reskilling is occupying the time and minds of industry, Government and Labour. Other issues include the creation of a vibrant small-scale mining sector, mine health and safety, occupational health and compensation issues, HIV/AIDS on mines, human resource development, migrant labour, industrial relations and unemployment (South African Minerals Review 1998-1999).

### **8.12 Exploration**

A trend worth noting is the declining level of local mineral exploration expenditure that has occurred over the past decade. Prior to the early 90's the belief that much remained to be found in the country as well as the sanctions against South Africa led most mining houses to spend the bulk of their exploration budgets within the borders of the country. South Africa's acceptance back into the global economy following the political changes in 1994 saw a flow of exploration funds to mineral prospective countries that did not exceed the risk

perception threshold of mining companies. Local exploration expenditure fell to somewhere less than 10 per cent of what it had been less than four years before. The shift in exploration expenditure was not this country's only loss; with the relocation of budgets came a shift in technological expertise and the removal of highly skilled personnel from the exploration arena in South Africa. The exceptionally long lead time for minerals development projects means that the effects of the removal of funds, technology and personnel from the South African exploration arena will only become apparent in 7 to 15 years time. Unfortunately a myopic view on this problem means that unless steps are taken now to increase our level of exploration expenditure in the country, minerals production cannot be sustained in the long run.

## **9. Summary**

The process of democratization has resulted in a reduction in the dependency of the government on mining income, as a result of:

- A more balanced economy and state expenditure, as a result of moving away from a "fortress economy" to a market economy
- Globalisation of the minerals industry, resulting in risk spreading and diversity, bringing with it competitiveness and efficiency
- A more open and market related economy
- Relaxation of currency exchange controls
- Steps forward in the process of regionalisation
- Increases in the manufacturing and tourism sectors
- The development of a minerals policy

These factors have enabled the industry to reposition itself, with the result that companies have restructured, and new entrants have arrived.

The effects of "Dutch disease" seem to have been overcome, but remain a threat to countries to the North.

Downsizing of the gold industry has had deleterious effects, but these have been accompanied by increases in activity in other economic and mineral sectors, and there has been some job preservation by the sale of mines to new companies who are able to operate these at a profit.

The climate has resulted in substantial amounts of investment in the minerals industry in South Africa.



South Africa is fortunate in having a range of minerals, of which it has a large proportion of the world's resources. Changes in markets and prices have meant that while production of some minerals such as gold and copper has decreased, other minerals have seen significant increases in production, notably PGMs, ferrochrome, coal and chromium. Thus a balancing effect is achieved.

Also of note is the fact that certain minerals, such as manganese, can only be traded in the market place at a volume that holds the price steady. Over supply will result in destruction of the market through price collapse.

This issue is one which developing countries rich in untapped minerals should be aware of, and over which some degree of protectionism may be necessary.

Downstream beneficiation has increased to a limited extent in South Africa. Much more could be achieved both locally and regionally if the correct fiscal incentives were put in place.

Whether all this results in the sustainable development of the industry is not certain.

The provision of social capital may be self destructive to the future development of the industry. Again, incentives for social capital provision from mineral rents will be far more effective than any system of imposed levies or penalties.

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## **2. ALIGNING MINERAL WEALTH WITH SUSTAINABLE DEVELOPMENT: THE SOUTHERN AFRICAN PERSPECTIVE**

**SEPTEMBER 2001**

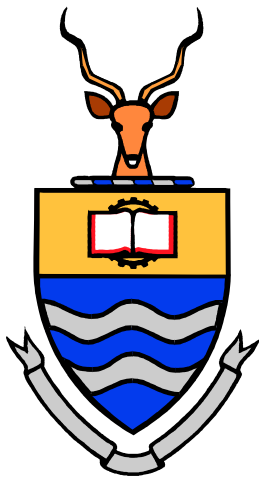
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## **CONTENTS**

**Section 1: Mineral rent: The essential ingredient of the wealth pie**

**Section 2: Defining rent sharing ratios for discussion purposes**

**Section 3: Sharing the rent: Discussing the wealth pie**

**Section 4: Collection of public rent in Southern Africa**

**Section 5: Visibility of mineral rent in the economies of Southern Africa**

**Section 6: Aligning Southern African policies with sustainable development**

**Appendix: Economic indicators for selected Southern African states**

**Simulation models for calculating rent collection in Southern  
Africa**

**Distribution models**

## **ABSTRACT**

*Minerals development is essentially the process of converting non-renewable natural mineral resources into reproducible capital. During this process rents (or wealth) are produced. The rents contained in the economic or wealth pie are for the benefit of the stakeholders in mineral development. Some of these stakeholders have well-established and strong bargaining powers, with strong teeth to secure a large share of the pie, while there are others who will only get a small bite of the enjoyment. There is often another group around this table, who are eagerly awaiting their chances of getting their teeth into the pie, only to find that the pie is finished before they can get a slice. This simple introduction highlights the realities of managing mineral wealth, namely:*

- ⊕ Sometimes there is no pie, because the essential ingredient (mineral rent) is absent, mainly because the cost of mineral development exceeds the revenue received for production.*
- ⊕ If indeed present, the wealth or economic pie is of finite size, meaning that its total size is not always that expected by stakeholders. This results in an expectation gap being created, the size of which depends on how well information is shared between the different stakeholders.*
- ⊕ Not all stakeholders have equal importance, resulting in some of them ending up with a larger slice of the pie.*
- ⊕ There is an inverse relationship between the shares of stakeholders, meaning that the larger the share of one stakeholder, the smaller the share of others.*
- ⊕ If the entire pie is absorbed today, there will be nothing left for future enjoyment.*

*This report discusses possible rent-sharing ratios and proposes an alternative approach for the management of mineral wealth. Historically, mineral development symbolised conflict between the various stakeholders because of self-interests.*

**The sustainable approach allows for early stakeholder identification and consensus on how the benefits must be shared, motivating stakeholders to work together in an attempt to grow the size of the pie. This style of mineral development will firstly, minimize the expectation gap and secondly, maximise stakeholder benefits.**

# ALIGNING MINERAL WEALTH WITH SUSTAINABLE DEVELOPMENT

## 1 MINERAL RENT: THE ESSENTIAL INGREDIENT OF THE WEALTH PIE

Mineral rent is the most fundamental ingredient of the wealth pie. Without rents there will no benefits to distribute among stakeholders. It is therefore appropriate to argue that only those mineral projects that are able to generate true rents should be allowed to continue. True rents are possible when *all* costs are covered, including the costs required for sustainable development

### 1.1 Introduction to mineral rent

The development of the concept of '*mineral rent*' grew alongside the early concerns about the distribution of returns from the agricultural sector (Robinson, 1989). The debate on mineral rent started when Smith (1776) adopted the classical view that the highest cost farm (mine) would determine the economic rent received by other farms (mines). Mines whose costs equal their mineral revenues would receive no rent while others that mine higher-grade deposits or are located close to their markets, receive rents. Smith's definition closely resembles the current understanding of economic rent. A drastic departure from Smith's way of thinking came when Ricardo (1821) argued that: "*Rent is that portion of produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil*". Ricardo's understanding of rent led to the term '*mineral royalty*', which is a facility to compensate the owners of mineral assets for resource depletion. Ricardo's interpretation of mineral rent does not entirely match the current understanding of economic rent. Later interpretations of rent emulated these early contributions by Smith and Ricardo, all of which, to some extent, resembled their theories or a combination thereof.

Among the many definitions of economic rent, a number have captured the varying perspectives of the underlying theory. Some of these are as follows:

- ⊕ The general approach is to define rent as the financial return over and above

that required to induce the initial investment.

- ⊕ Cordes (1998) redefined economic rent as *“the magnitude of revenues that can be taxed without causing the pattern of resource use to be altered”*.
- ⊕ An expanded definition of economic rent for the minerals industry is: *“the present value of the future stream of net revenues that mineral deposits can generate over time, where net revenues are the difference between total revenues and total costs and costs include a competitive return on investment”* (Cawood, 1999).

## 1.2 Distribution of mineral rent

Unlike the magnitude of rents that are determined by the unique characteristics of the mineral deposit, the distribution of rents is primarily influenced by three main factors. *Firstly*, the legal system of a host country identifies the recipients of mineral rent. *Secondly*, the host country's fiscal policies, resource owners' expectations and public opinion determine the rates of allocation to each recipient. *Thirdly*, the hierarchy of claim to rents is prescribed principally by the national objectives but can be modified by social pressures. One must appreciate that the hierarchy of claims to mineral rents may differ significantly from project to project and country to country, depending on how government policies allocate relative stakeholder bargaining powers.

The identity of each recipient is distinct, but any combination of recipients is possible. The simplest means of distribution is where the government, on behalf of the public, is entitled to all the rents. Examples of potentially profitable mining operations that have been neglected in centrally planned economies suggest that state intervention in the control and ownership of mineral properties is not sustainable in the long run. The copper mining industry in Zambia is a prime example. An alternative means of distribution is private control of all categories of rights and property, allowing for little or no state intervention. The disadvantage of such a system is that many stakeholders share the rent, thereby reducing each recipient's portion. This is particularly true for South Africa where the mineral rights in some areas were subdivided into undivided shares, resulting in large numbers of mineral right holders over the same mineral deposit (Minnitt and

Cawood, 1999).

Section 2 of this report shows that the state, investor, mineral rights owner, environment, indigenous community and the landowner should be the principle beneficiaries of mineral development but, depending on the uniqueness of the situation, there may be more (or less) stakeholders sharing the wealth. By and large, these other (minority) stakeholders will claim insignificant rents, which may be compared to a few crumbs spilled during the feast.

### 1.3 A practical approach to quantify mineral rent

No investor or government would deny the existence of rents derived from the exploitation of non-renewable mineral resources, but determining the size and nature of these rents is easier said than done. One might argue that the mineral royalty distinguishes the mining industry from the rest and is therefore the ideal fiscal instrument to equate with mineral rent. Although this simplistic '*Ricardian*' approach has merit, it is not practical because of the huge variances in royalties for the region, especially South Africa with its mixed (highly complex) system of mineral rights ownership.

Perhaps a more appropriate method of quantifying mineral rent is by means of natural resource accounting methods. The United Nations (1993) National Accounting Standards propose a system where resource rents are calculated as the value of output less production costs. Production costs are defined to include mining input costs, labour costs, capital costs and the required return on the investment. Cawood (1999) also followed this approach for determining sharing ratios between host governments and investors, which will be discussed in more detail in Section 4. The net result is that both the return on the investment (i.e. the return above the initial hurdle rate) and government receipts are treated as total rent, because of the inseparable way governments administer taxes and rents.



## **2 DEFINING RENT SHARING RATIOS FOR DISCUSSION PURPOSES**

This section proposes a rent distribution model for discussion (Section 3), and later comparison (Section 4), with government ratios in Botswana, Mozambique, Namibia, South Africa, Tanzania, Zambia and Zimbabwe. The fiscal parameters for the cash flows used in this section were taken from an earlier study by Cawood (1999), who derived a Competitive Investment Framework (CIF) from the policy information of developing countries<sup>1</sup> that attracted significant (foreign) mineral investment into their economies as a direct consequence of changes in policy. These results were then statistically analysed in order to establish a rent-sharing ratio that would be regarded as internationally competitive and attractive to the international investor. The framework's fiscal parameters, meant as a guide for alterations or additions required by other developing countries wishing to attract foreign direct investment, was entered into the cash flow models in order to derive a distribution model for discussion and comparison purposes. Like these 'model' countries, Southern Africa is well endowed with mineral resources<sup>2</sup> and the region depends heavily on the responsible economic development of these primary assets. The host governments in the region are responsible for policy-making, which policies must provide the fuel for the engine (mining industry) in an effort to generate mineral rents and, consequently, ensuring sustainable economic development.

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1 The selected countries were Chile, Argentina, Indonesia, Peru, Mexico and Ghana.

2 Some examples are gold on the South African Witwatersrand, copper in Zambia, the diamond deposits in South Africa, Namibia, Angola and Botswana, and the minerals associated with the Great Dyke region in Zimbabwe.

## 2.1 The model and project specifications

The model in the appendix serves as a tool to policy-makers deciding on the ratios of how rent should be shared between the stakeholders in mineral development. The model consists of four components, namely a control page, cash flow, charts and depreciation schedules. The parameter settings and results appear on the control page (page 1 of the model) where the user enters finance, inflation, risk parameters, project specifications and fiscal information into the model. The second component is the cash flow section (page 2 of the model). All the information was processed in the cash flow over the life of the mine. The most important information is then summarised on the control page for the sake of convenience. Part three (also on page 1 of the model) consists of two pie charts summarising the information necessary for discussion and comparison in sections 3 and 4, namely splitting of wealth between the investor and host government and a quick visual assessment on the breakdown of taxes. Part four (bottom of page 2) shows the depreciation schedules of the cash-flow calculation. Five mineral projects were used in this analysis: a large South African Witwatersrand type gold mine; a greenstone type gold mine; a large limestone project; a medium-sized underground coal mine and a copper mine.

## 2.2 Definitions impacting on rent used in the model

**NPV of total state share:** The discounted net present value of the total host government receipts (i.e. the sum of the following sources of state revenue: royalty, income tax, VAT, import duties, export tax and withholding or dividend tax). It may also be termed *State share of wealth* i.e. the discounted net present value of the NPV of total state share divided by the sum of investor NPV and the state's share, expressed as a percentage. It is collected through the average effective tax rate i.e. the discounted net present value of all taxes *divided* by the discounted NPV of taxable income, expressed as a percentage.

**Investor NPV:** The nominal gross revenue *less* total capital costs, value-added tax, import duties, export tax, royalty, nominal operating cost, annual repayment of loan, income tax and withholding or dividend tax, adjusted by the discount rate. It is therefore the discounted net present value of the return on the investment after

costs and taxes have been subtracted or *'Investor share of wealth'* (i.e. the discounted net present value of the investor's share of the wealth (net present value of the project) divided by the sum of the discounted net present values of the project and the state's share of the wealth, expressed as a percentage.

**Discount rate** The discount rate used in the model is a function of financial, business, and country risks. The *Weighted Average Cost of Capital* model (WACC) as described by Smith (1995) determines the discount rate in the model. The cost of capital is expressed as an interest rate and calculated using the following formula proposed by Sani (1977):

$$r_{WACC} = r_e p_e + r_d p_d + r_p p_p \quad \text{where} \quad r_e = f + R\beta$$

$$\text{Corresponding nominal discount rate} = r_{WACC} + i + C$$

*Where:*  $r_{WACC}$  = Weighted average cost of capital expressed as a percentage;

$r_{e,d,p}$  = Cost of equity capital, debt and preferred stock;

$p_{e,d,p}$  = Proportions of equity capital, debt and preferred stock;

$f$  = Risk-free rate (based on US government bond or treasury rates)

$R$  = Risk premium. Ten per cent was used in all the cash flows.

$\beta$  = A beta factor of 1,0 was used for all projects. The Beta Factor for a common stock expresses the variability of the common stock with respect to the variability of the market as a whole.

$i$  = Inflation, as indicated by the US Consumer Price Index (CPI).

$C$  = A standard country risk rate of three per cent for all cash flows.

In order to avoid unacceptable variations in the discount rates for the selected countries, a decision was made that a United States loan would finance the debt proportion of the capital.

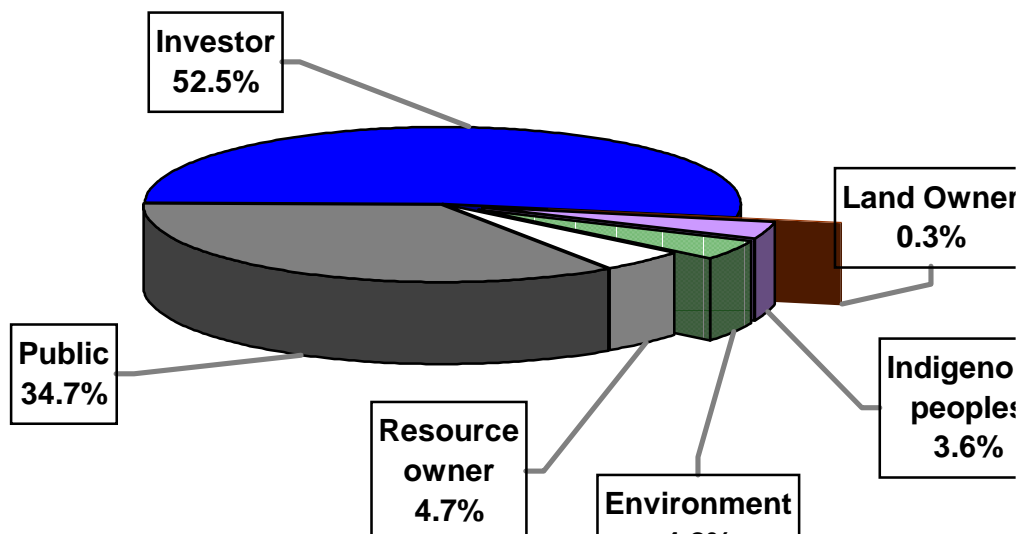
**Models for calculating indigenous NPV.** All the fiscal parameters of the CIF were used, except for the mineral royalty, which was replaced by a rate of one per cent of turnover in order to resemble the minimum payment expected by the Royal Bafokeng for platinum mining in their territory.

**Rent distribution tables (Final page of the appendix).** Summary of 1996

prices for stakeholder shares.

- ⊕ **Project NPV:** The amount indicated as *'Investor NPV'* from the cash flows using CIF averages;
- ⊕ **Land owner's rent:** The Stats SA sales value converted to US dollars;
- ⊕ **Resource owner's rent:** The amount indicated as *'Royalty NPV'* from the cash flows using CIF averages;
- ⊕ **Environmental rent:** The estimate for environmental expenses converted to US dollars;
- ⊕ **Indigenous rent:** The amount indicated as *'Royalty NPV'* from the cash flows calculating indigenous NPV;
- ⊕ **Investor rent:** The project NPV *minus* Land owner's rent; Resource owner's rent, Environmental rent and Indigenous rent.
- ⊕ **Public rent:** The amount indicated as *'NPV of total State share'* from the cash flows using CIF averages *minus* the royalty NPV.

Figure 1 A discussion pie for the developing world



Source: Appendix (Rent distribution tables)

### **3 SHARING THE RENT: DISCUSSING THE WEALTH PIE**

In the previous section, a rent-sharing model was introduced for discussion purposes. Although great care went into the design of the model in order to obtain a realistic distribution of rents, the reader should not assume that the model is complete. It merely forms a basis for discussion and comparison in an attempt to analyse the split of wealth. One must also consider that these (major) stakeholders often have to share their slices of the wealth pie with other, less important, stakeholders. For example, the national government has to share with lower levels of governments while investors must share with labour (bonus payments) and the local community (contributions to local health and education facilities). Understandably, relationships between different stakeholder (groups) are often poor and greater understanding of stakeholder needs is an essential element of any strategy to share the pie equitably. A good mineral policy not only provides a clear description of the environment investors must operate in - it must also engineer an acceptable distribution model.

Equitable sharing of mineral resource rents between the host country and the investor developing the mineral property, is one of the principle factors in ensuring political stability and the creation of an enabling mining environment in the developing world. The reason investors place their capital in mineral projects is to create wealth for themselves. They therefore require a reasonable return on their investment. The distribution of rent between the country hosting the mineral resource and the investor is therefore of critical concern to them. The recipe for the distribution of rent between the investor and the host country must be equitable to both parties at all times. Cawood (1999) determined an optimal rent sharing model of how total mineral rents should be shared between the investor and an internationally competitive and investment friendly host government. He found that, on average, about forty per cent of the wealth generated should find its way to state coffers while the investor should retain sixty per cent for its effort. There is good correlation between Figure 1 and the 1999 study, in that the sum of public and resource owner's rents in Figure 1 amounts to about forty per cent, as would be the case where the minerals are owned by the state.

### 3.1 *Investor Rent*

Investors, who demand blue-sky potential as compensation for risks involved, rely on the host country's good-will as reflected in policy documents, capable management and efficiency in production to maximise their share of the rent. Figure 1 indicates that the investor receives about fifty per cent of the total rent. Although this slice may seem excessive at first, one must appreciate that there are some (cost) variables that are extremely difficult to reflect because of their 'hidden' nature. Examples are payroll taxes, fuel levies, goodwill contributions to local health and education facilities and employee bonuses during times of high profitability. It is therefore realistic to assume that the investor has to reallocate a percentage to other stakeholders and minority interested and affected parties. The end result is that the investor and the host government will probably retain approximately equal proportions of the mineral rent.

#### 3.1.1 **Strategy to optimise investor rents**

The investor optimises finance, management and production efficiency to grow the size of the pie. One must appreciate that *optimising* the investor's slice of the pie falls outside the ambits of public policy and is therefore not considered in this discussion. However in order to *maximize* its share of the pie it (the wealth pie) must grow in size, which will be in the interest of all stakeholders. In order to *maximise* its benefits, the investor should consider the following strategy:

- ⊕ Early identification of all stakeholders, regardless of their importance;
- ⊕ Negotiate fixed wealth sharing ratios with all stakeholders using a participatory, open and consensus approach.
- ⊕ Negotiate a fixed sharing ratio with the host government through a single all-inclusive tax rate. This different approach may be viewed with scepticism by some governments. However, it is not entirely new considering the use of stabilization agreements in Latin America and recent commitments that the overall effective tax burden will not be above a certain percentage. For example, the Chilean Foreign Investment Law provides for tax stability (up to 10 years) at a rate of 42 per cent as the effective total income tax charge (Warden-Fernandez and Wälde, 2001).

- ⊕ Treat the workforce as one of the stakeholders when increased profits grow the size of the pie. This will mean that special bonuses be paid to workers when profitability reaches certain fixed pre-negotiated targets.

### 3.2 Public rent

Figure 1 suggests that taxes should contribute to about thirty-five per cent of the entire wealth pie. The reader should note that mineral royalties, discussed in the next paragraph under resource owner's rent, must be added to public rent where private ownership of mineral rights is disallowed by the host country. Considering the United Nations' endorsement of State's sovereignty over natural resources, a concept eagerly adopted by most developing countries as a symbol of opposition to colonialism, mineral royalties should resort under public rent. The reason why this study distinguishes between mineral royalties and taxation is because of South Africa's unique system of mixed private and state-owned mineral rights<sup>3</sup>, which system is about to change to exclusive state ownership of mineral rights. The unique distribution of mineral rights in South Africa prompted the state to reserve certain '*strategic*' minerals in its favour in an attempt to secure additional public rents<sup>3</sup> from these national assets despite them being privately owned. It started by means of a lease consideration formula that was first introduced in 1910, which concept later replaced the flat (corporate) tax rate following the recommendations of the Corbett Commission of Inquiry in 1936. The end result was that gold mines were '*taxed*' twice on basically the same formula. The salient features of '*formula taxation*' are listed below:

- ⊕ Government collects more taxes during periods of high profitability, but get less when profit-to-revenue ratios are low.
- ⊕ If not connected to a minimum rate (as is the case with Botswana and Namibia), the formula may result in a zero tax liability;
- ⊕ The tax liability can be reduced, and even waived, when profits are reinvested;

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3 For a comprehensive discussion on mineral rights and the evolution of formula tax in South Africa, see Cawood and Minnitt (1998) and Cawood (1999) respectively.

If resource owner's rent is added to that of public rent, it shows that the host government will receive approximately forty per cent of the wealth pie, which supports Cawood's (1999) optimal sharing ratio. Although forty percent appears to be an appropriate benchmark in the developing world, this ratio will vary depending on country specific characteristics and the risks host governments and investors are prepared to tolerate. Equitable sharing between government and the investor, while at the same time optimising the benefits derived from utilising the mineral resource, is no easy task because of the inverse relationship between the respective slices of the pie, which causes conflict in decision-making. Conflict between the two parties also stems from their perceptions of what constitutes a fair split. Because each nation's circumstances, needs and objectives will shape its own unique minerals and taxation policies, no ideal or model for sharing mineral rents is available to policy makers (Cordes, 1998). Rents collected by host governments as custodians of the national patrimony from mining operations are normally distributed as public rents to the population in the form of services and infrastructure. Before investigating possible ways of optimising public rent, one has to understand the composition thereof, which is briefly discussed below.

#### *Corporate tax contribution to public rent*

From the information in Section 4, the reader will note that the corporate income tax is the most important contributor to state revenue, with about eighty per cent of all the revenue received by the host governments in the developing world coming from this source over the life of a mineral project. The corporate tax rate is of prime importance to the foreign investor who will use it as the first direct tool for comparing the tax competitiveness of host countries. The result is that host countries set their corporate tax rates below or within the 30 to 35 per cent global average in an attempt to lure investment into the country. However, sometimes states compensate for this 'loss' by introducing more and higher levels of minor taxes, thus creating a perceived competitive regime. Investors favour a tax regime where the corporate tax system accounts for most (preferably all) taxes because it is easier to estimate the total tax liability over the life of the mine.



### *Mineral royalty contribution to public rent*

A royalty is the second most important minerals tax instrument where mineral rights are publicly owned, and accounts for approximately five per cent of the wealth pie shown in Figure 1. The state, in its role of custodian of the natural resources of the country, expects a royalty payment for the removal of mineral products from within its borders. This payment may take the form of periodic instalments (mineral royalties and/or severance taxes), a lump sum payable in advance (outright sale of the mineral rights and/or auctioning the right to develop) or complex variations and combinations of periodic and lump sum instalments. However, there are international examples of countries that do not charge mineral royalties, such as Chile, Peru and Zimbabwe<sup>4</sup>, but such a 'weakness' in mineral policy will cause shortages in distributable rent if these are not collected under some other guise.

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4 During a recent (July 2001) public announcement in Pretoria at the SADC Committee of Mining Ministers at Southern Africa – Australia Minerals Sector Synergies Symposium, the Zimbabwean Minister of Mines indicated that his government is in the process of introducing mineral royalties. Such royalties will be charged up to a maximum of ten per cent (non tax deductible) of the sales value.

*Comment:* This is the classic example of a government that are now introducing extreme policy measures through particularly high mineral royalties in response to public (political) pressure because of a history of no mineral royalty payments to the state, during which time natural resources were depleted.

Related to mineral royalty payments are severance taxes and state reservation of *'the right to mine'* minerals. Generally speaking, these are instruments designed to allow for some compensation to the public in the event of mineral rights not being state-owned. South Africa has a long history of reserving the *'right to mine'* certain mineral types to the state (Cawood and Minnitt, 1998) such as precious stones, precious metals and oil. This reservation has been reintroduced as a prominent feature of the new minerals policy. Unlike in the past, where only the right to mine minerals of strategic importance was reserved to the state, the new policy makes provision for the vested right on all mineral types.

### **Minor tax contribution to public rent**

The remainder of public rents is made up of minor taxes, such as minimum taxes (Mexico and Indonesia), additional profits taxes (Mexico and Ghana), capital gains taxes (Indonesia), fuel taxes (most countries), withholding taxes (Indonesia), import/export taxes (Indonesia) and payroll taxes (most countries). Although these taxes are usually charged at low rates, they have *'nuisance'* value and because together they can severely impact on the split of rent between the recipients, these minor taxes should be restricted to a minimum.

### **Conflicts within government**

In an attempt to answer the question, *'Who should get natural resource revenues'* Scott (1978) identified several criteria for the level of government collection and the distributional requirements of natural (mineral) resource rents. In terms of the Southern African situation, Scott's observations on the following issues could be considered:

- ⊕ The right of lower levels of government to share in the rent through the collection of royalty-like payments. However, Southern African governments generally do not allow the collection of mineral royalties by lower levels of government.
- ⊕ The importance of distributional grants to promote equity between mineral-rich and mineral-poor provinces. The South African government established a central revenue fund for this purpose (Constitution, 1996).

- ⊕ The uniqueness of the mineral deposit in terms of commodity, markets, life of the operation (which is related to size), locality and existing infrastructure. Some areas may be more sensitive than others to sudden mine closures and may therefore require a larger proportion of rent, especially for mineral operations with a short lifespan.
- ⊕ The size, location and demography of the population to whom the benefits should be distributed. This may be especially important where gross geographic product and infrastructure are vastly disparate as is the case with South Africa.

### **3.2.1 Strategy to optimise public rents**

The host government must engineer a public policy that will allow the investor to grow the size of the pie so that the public can share in these benefits through the wealth collected by fiscal instruments. Hence, by optimising public policy, the slice of the government will be maximised, even though the sharing ratio remains the same. Host governments interested in maximising their slice of the pie through optimising public policy could consider the following issues:

- ⊕ Define the possible contribution of the minerals sector by including the undeveloped mineral assets into the national accounts system, similar to the approach proposed recently for South Africa by Blignaut and Hassan (1991).
- ⊕ Actively participate, possibly taking a leading role, in the process where the investor will identify stakeholders and negotiate fixed wealth sharing ratios with them.
- ⊕ Negotiate a fixed ratio with the investor through a single tax rate that will account for all taxes, except for the mineral royalty that should be managed separately.
- ⊕ Decide on how the public rent mentioned above should be shared among the different levels of government.
- ⊕ Introduce a uniform mineral royalty nationally as compensation for the loss of a national asset, which should be managed separately from other government revenue along the principles of sustainable development.

- ⊕ The negative environmental and socio-economic consequences of mine closures are normally borne by local governments. This suggests that there is a case for certain minerals to be owned and managed by lower levels of government. Low value aggregates and construction materials that are locally exploited and marketed are good examples. However, this will take some motivation, because most of the states in Southern Africa do not make provision for sharing mineral rents with lower levels of government.

### 3.3 *Resource owner's Rent*

Because the norm in developing countries is for mineral rights to be publicly owned, resource owner's rent has already been partially included in the discussion of public rent. However, South Africa presently still recognises private ownership of mineral rights, which merits a separate discussion of resource owner's rent. If such private ownership of mineral rights is allowed, the investor is responsible for distributing the royalty to the holder of the mineral rights.

A mineral royalty is, by definition, payment to the holder of the mineral rights as compensation for the extraction and alienation of minerals from the land. Where private ownership of mineral rights is allowed, mineral royalties are payable directly to the holder of the rights as opposed to public ownership, where the host government or its nominee collects the royalties. The magnitude of the royalty payment for mineral resources of comparable value should theoretically be equal, regardless of ownership status. The identity of the owner of mineral rights has a strong influence on the size of rent available for distribution. For example, the self-interest of private individuals on privately-owned mineral rights results in higher compensation for the rights than the state, whose officials, responsible for collecting rents on behalf of the nation must act within the policy framework. Even for similar deposits, the distinction between the royalties payable to the state and that to private entities is necessary because the compensation expected by the two parties may be significantly different. It is the unique characteristics of the resource, such as location, size, shape, depth and grade, that should determine the price of the mineral rights, rather than the identity of the owner.

### 3.4 *Environmental Rent*

A valid concern for nature justifies that some portion of the economic rent is distributed towards caring for the greater environment. Historically environmental concerns have not attracted the regard that they are due, but the growing awareness of environmental responsibility has altered the pattern of wealth sharing. These are combined with emotive arguments to change sharing ratios so that environmental costs are likely to continue to grow. This is especially true of developed nations, where environmental compliance costs and contributions to environmental conservation programmes are expected to be much higher than the estimate of four per cent currently indicated in Figure 1. Finance institutions are also playing an increasing role in caring for the environment by pressuring non-compliant mining companies to treat the environment according to its value to society. An example is the World Bank recommended closure of the Ok Tedi copper operation (Mining Journal, 2000).

#### **3.4.1 Strategy to optimise environmental rents**

The host government, as custodian of the national patrimony, has the responsibility of ensuring that the greater environment is cared for through its policies. The minimum requirements would be as follows:

- ⊕ Develop a culture of caring for the environment among the entire population as a national priority.
- ⊕ Create environmental regulatory structures for mineral development that are able to collect time series data for environmental analysis, set environmental standards and monitor performance relative to these standards.
- ⊕ Allow for comprehensive base-line studies in order to value environmental compliance costs, alternative (competing) land use applications and mineral rents accurately.
- ⊕ Enforce environmental standards by penalising violators (*polluter pays principle*) and reward those developers who achieve standards in pollution intensity per unit of output produced.

### 3.5

### Indigenous Rent

The increasing bargaining strength of indigenous rights movements has resulted in local and aboriginal communities receiving additional compensation and contributions towards their socio-economic programs. The legacy of colonial rule left a culture of deep-rooted dissatisfaction in the developing world because of the disregard for indigenous rights through *'forced'* land dispossessions. Failure to recognise these rights has led to severe civil and political disruptions in many developing countries. Zimbabwe, the Democratic Republic of the Congo and Sierra Leone are cases in point. The closure of the Bougainville copper mine as a result of rebel activity in Papua New Guinea is considered to be the most serious national crisis since its independence (Thompson, 1991). The recently resolved Bougainville crisis (1988 – 2001) began when local landowners sought a bigger share of revenues from the large copper mine at Panguna.

There is a broader awareness in industry of the need for community involvement in planning and decision-making and the need for good community relationships. Contributions towards social programmes have resulted in the emergence of fringe recipients, not through legal entitlement, but in the interests of goodwill. Examples include the provision of health and education facilities, job creation programmes and social upliftment programmes. Richards Bay Minerals in Kwazulu-Natal (South Africa) and Western Mining's copper operation in Tampakan (Philippines) are two examples.

Based on the example of the agreement between the royal Bafokeng Nation and Impala Platinum in South Africa, we can assume that indigenous peoples should receive a minimum payment of one per cent on sales revenue. This one percent royalty was built into the simulation models (latter part of Appendix B) in an attempt to quantify indigenous rents, which rents amounted to an average of about four per cent of the total wealth pie (as shown in Figure 1).

There may be wide divergence of views between national governments and local communities, and open conflict over how revenue is shared, how adverse economic

and social impacts of mineral development will be mitigated and how the benefits could be sustained after mine closure.

### 3.5.1 Strategy to optimise indigenous rents

The host government has yet again a major role to play in ensuring that indigenous communities are considered during mineral development. Some legislation, like for example the draft South African Mineral Development Bill, provide for discretionary payment of royalties, or part of the royalties, to local and/or indigenous communities. However, this general and often insensitive approach does not provide for sustainable development of the community and the following issues are worth considering by host governments:

- ⊕ Develop an official *Negotiation Policy* as is the case with the Chilean '*Compensation Policy*' that defines the rights of all parties and set the framework for compensation using a consensual approach.
- ⊕ Create a comprehensive geographic information system (GIS) on all aspects of indigenous communities that will assist mine developers with stakeholder involvement. Such a GIS would be critical in deciding on the legitimacy of indigenous stakeholders. The Land Restitution Policy in South Africa may be used as a guide to compile a database of legitimate claimants.
- ⊕ Actively participate in ensuring that mine developers channel an appropriate share of the wealth pie<sup>5</sup> towards these communities.

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5 These benefits may include any one or combination of a variety of schemes, such as direct contributions to primary health and education facilities, periodic instalments paid into a fund specifically designed to benefit communities, adult skills and literacy programmes, preference to locals when contracting employees, etc.

### 3.6 *Landowner's Rent*

When the mining company is not the owner of the surface title, the landowner becomes a legitimate recipient of mineral rent. These owners include private entities (that may include the indigenous community), the host government (at national, provincial or local government level) or environmentalists (national parks). As in the case of mineral rights, the payment to the landowner is affected by his/her identity. The land value in an environmentally sensitive or fertile area is almost certainly higher than that of arid land. The surface title owner may obtain these rents through outright sale or surface rental fees. Coal mining companies in South Africa, after buying the land from the owners, frequently allow them to continue using unaffected and/or rehabilitated areas at a nominal rental fee. In addition, they frequently allow owners the first option to buy the land back at a nominal price when mining operations finally cease. Figure 1 shows that the landowner receives a small and apparently insignificant proportion of total rent.

#### **3.6.1 Strategy to optimise land rents**

Although one might argue that government should not interfere with the landowner's rights to (exclusively) develop the land for its own benefit, one must appreciate that governments often own vast tracks of land, in addition to having permitting or administrative powers over privately owned land. There is therefore a legitimate role that governments should play in optimising land rents, over and above the usual land sales price that represents a market-clearing price. Within the framework of sustainable development, governments can consider the following issues:

- ⊕ Create a comprehensive geographic information system on all land and mineral title that will assist mine developers with stakeholder involvement.
- ⊕ Promote equitable and appropriate standards for valuing property in order to maximise stakeholder benefits. Valuation standards are especially important in the presence of competing land uses.



## **4 COLLECTION OF PUBLIC RENT IN SOUTHERN AFRICA**

This section will define mineral rents received by Southern African states where after section five will attempt to measure government efficiency in distributing the rents back to the general population. In order to arrive at a realistic estimate of the size of government revenues from mineral projects, and arriving at valid conclusions and making recommendations, the total tax *'package'* must be considered first. This section addresses the issue by calculating effective tax burdens in Southern Africa and then analysing the ratios in which mineral rent is split between the two major recipients. This is achieved by entering country-specific information into the cash-flow model discussed earlier. The analysis in this section is based on calculating tax payments typically incurred by mining projects during their lives in each of the selected countries. The reason why comparison of effective burdens is preferred above that of marginal tax rates is because statutory tax rates could differ substantially from effective tax rates. This is because credits and other economic variables, such as depreciation, inflation, exchange rates and the definition of taxable income have the potential to significantly influence the size of the tax payment. Although most direct taxes were included in the model, only three categories are of concern to this study, namely corporate or income taxes, mineral royalties and minor taxes. Hidden taxes, e.g. payroll taxes and fuel levies were excluded because of the difficulty of quantifying them in a cash-flow model of this nature.

### **4.1 Analysis of mineral rent collected in Southern Africa**

The host government uses fiscal instruments to recover the public's entitlement of mineral rent. These instruments can be classified into three main categories, namely corporate income taxes, mineral royalties and minor taxes, the relative efficiencies for both the competitive model (Cawood, 1999) and Southern African States are shown in Tables 1 and 2.

**Table 1 Analysing mineral rent in Southern Africa**

Description	Botswana	Mozambique	Namibia	South Africa	Tanzania	Zambia	Zimbabwe	Average
<b>Public rent</b>								
<i>Greenstone gold</i>								
Income tax (%)	40	58	67	85	63	46	70	61
Royalty (%)	21	21	21	12	16	14	0	15
Minor taxes (%)	39	21	12	4	21	39	30	25
<i>Witwatersrand gold</i>								
Income tax (%)	31	45	52	68	49	41	68	51
Royalty (%)	37	36	36	25	28	25	0	27
Minor taxes (%)	32	19	11	7	23	34	32	22
<i>Limestone</i>								
Income tax (%)	45	64	68	61	64	47	71	60
Royalty (%)	12	12	20	17	15	13	0	13
Minor taxes (%)	43	24	12	21	21	40	29	27
<i>Coal</i>								
Income tax (%)	45	68	74	66	70	49	71	63
Royalty (%)	13	8	13	12	10	9	0	9
Minor taxes (%)	42	24	12	22	20	42	29	27
<i>Copper</i>								
Income tax (%)	40	59	59	56	55	68	69	58
Royalty (%)	19	18	29	23	23	13	0	18
Minor taxes (%)	40	23	12	21	22	19	39	24
<b>Public rent Averages</b>								
Income tax (%)	40	60	64	67	60	50	70	59
Royalty (%)	20	19	24	18	18	15	0	16
Minor taxes (%)	40	21	12	15	22	35	30	25
<b>Distribution rent</b>								
<i>Greenstone gold</i>								
Public rent (%)	51	52	51	45	40	30	46	45
Investor rent (%)	49	48	49	55	60	70	54	55
<i>Witwatersrand gold</i>								
Public rent (%)	85	90	89	64	67	49	64	73
Investor rent (%)	15	10	11	36	33	51	36	27
<i>Limestone</i>								
Public rent (%)	49	49	51	44	41	30	47	44
Investor rent (%)	51	51	49	56	59	70	53	56
<i>Coal</i>								
Public rent (%)	51	50	50	43	40	30	48	45
Investor rent (%)	49	50	50	57	60	70	52	55
<i>Copper</i>								
Public rent (%)	50	54	60	51	44	47	44	50
Investor rent (%)	50	46	40	49	56	53	56	50
<b>Distribution of rent Averages</b>								
Public rent (%)	57	59	60	49	46	37	50	51
Investor rent (%)	43	41	40	51	54	63	50	49

Source: Appendix – Raw data from Resource Service Group CD, 1999.

[www.rsg.com.au](http://www.rsg.com.au)

The rent distribution models show clearly that *firstly*, the corporate income tax is by far the most important contributor to state revenue in Southern Africa and secondly, the tendency for these states to identify minor (and hidden) methods of taxation to supplement tax revenue. On average fifty-nine per cent of all the revenue received by Southern African governments over the life of a mineral project comes from corporate taxes. However, the competitive model (using the tax information of countries that secured significant investment for their mineral

sectors) derives more than eighty percent of government revenue from this source. Although the corporate tax rate is the first instrument introduced to the foreign investor, the cash flow results show clearly how misleading this instrument is as a direct comparison tool for determining the tax competitiveness of a country. An interesting observation from the results in Table 1 is that Botswana (only forty per cent of public rent is collected through corporate taxes) and to a lesser extent Zambia (fifty per cent), opted for lower corporate tax rates (twenty-five per cent for Botswana and fifteen to thirty-five per cent for Zambia) in favour of minor taxes charged at higher rates.

The second most important minerals tax instrument is the mineral royalty. On average Southern African States expect sixteen per cent of all their revenue from mineral projects to come from this source. For the time being, Zimbabwe is the only exception to this rule, but is in the process of introducing measures to collect mineral royalties. The strategy of collecting no mineral royalties was used successfully during the early days of mining in the western areas of the United States in an effort to promote (colonial) development on traditional Indian land through mining activity. However, with the maturing of the United States and the development of International Law to the extent that it is now skewed in favour of indigenous (Anaya, 2000) and environmental rights, the federal government is now under tremendous pressure to impose a mineral royalty in order to compensate for these issues. Most countries in the developing world regard mineral resources as part of the national patrimony and the general public expect some compensation when these (national) assets are depleted through mining, especially if the industry turns out bonanza returns. The public, especially communities living in close proximity to mines, expect to share in the wealth of mining and, if they don't experience tangible benefits, the ruling political party can be open to severe criticism, which can ultimately lead to their downfall.

The remainder of public mineral rent in Southern Africa is made up of minor taxes such as free equity (Botswana), value added tax or VAT (all countries except Zambia where mining is exempt from VAT), withholding taxes (all countries) and import taxes (Tanzania). Although these '*nuisance*' taxes are

usually charged at low rates, together they potentially have a severe impact. For this reason investors prefer a simple tax regime where these minor taxes are restricted to a minimum. Table 6 indicates that the sum of these taxes constitute a significantly large proportion of the total tax burden. It seems that Botswana (forty per cent) and to a lesser extent Zambia (thirty-five per cent) have targeted these taxes to raise more income for the government from the mining industry.

Table 2 compares the average ratios of the selected Southern African States with the competitive and investment friendly model derived by Cawood (1999). On the basis of this information, the international competitiveness of the current Southern African regime is questionable, but a discussion thereof falls outside the scope of this study. One area that requires further research is the magnitude and extent of Southern Africa's minor taxes. The impact of these taxes is outside the competitive range for most of the selected countries. Botswana, Mozambique, Namibia, South Africa and Tanzania need to investigate their mineral royalty regimes as these are also above the competitive range.

**Table 2 Tax competitiveness of Southern African states**

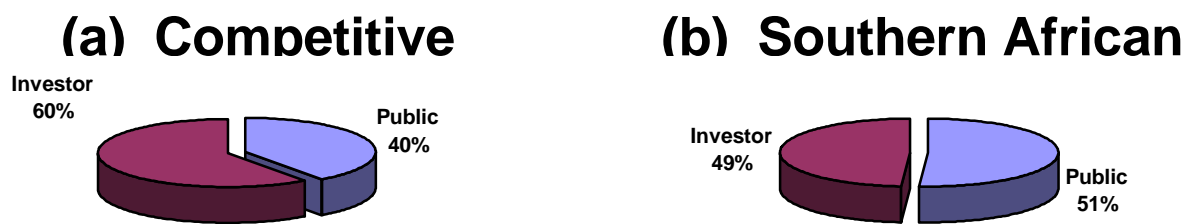
Description	Botswana	Mozambique	Namibia	South Africa	Tanzania	Zambia	Zimbabwe	Average for Southern Africa	Competitive (optimal) range	Competitive (optimal) average
<i>Public rent Averages</i>										
Income tax (%)	40	60	64	67	60	50	70	59	28 – 97	77
Royalty (%)	20	19	24	18	18	15	0	16	0 – 17	6
Minor taxes (%)	40	21	12	15	22	35	30	25	3 - 16	8
<i>Distribution of rent Averages</i>										
Public rent (%)	57	59	60	49	46	37	50	51	32 – 43	40
Investor rent (%)	43	41	40	51	54	63	50	49	43 - 68	60

Sources: Table 1 & Cawood (1999)

The competitive model shows clearly that the investor is entitled to a greater share of the mineral rents derived from mining and, as illustrated in Figure 3a, suggests a split of about 60 to 40 in favour of the investor. Figure 3 clearly reveals the inverse relationship between investor and public rent. The reader

must appreciate that the distribution of rents for the Southern African model (Figure 3b) will be severely influenced by the extent of the orebody, quality of the mineral reserves and relative ease of extraction because of the inclination for formula-style taxation (South Africa, Namibia and more recently Botswana) in the region.

Figure 3 Modelled distribution of total rent



Source: Table 2

The information in this section suggests that, on average, governments in Southern Africa demand about fifty per cent of the wealth, which implies that these states have instituted fiscal policies that will ensure an adequate share from mining. This observation is supported by the 2001 World Development Indicators as published by the World Bank (pp. 286 – 289). It shows that the average tax revenue, as a percentage of GDP for 1999, for the countries selected to compile Figure 3a, is about 15 per cent while that for Southern Africa is generally above twenty per cent (25.6% in South Africa and 26.1% in Zimbabwe).

## **5 VISIBILITY OF MINERAL RENT IN THE ECONOMIES OF SOUTHERN AFRICA**

We have established in Section 4 that the policy and fiscal instruments of Southern African governments are designed to secure sufficient public rents from mineral development. This section will describe the visibility of mineral rents in the economies of the selected countries by answering the following fundamental questions:

- ⊕ *Is the Southern African mining sector sustainable?*
- ⊕ *Has the Southern African mineral sector made a positive contribution over time?*
- ⊕ *Did Southern African governments distribute the wealth collected from their mineral sectors equitably?*

### **5.1 Broad-based sustainable mineral development**

*What is broad-based sustainable development?* The goal of broad-based sustainable development (BBSD) is that equitable, participatory and environmentally sustainable principles must be aligned with economic growth (Weaver et al, 1997). Sustainable income is understood as the “*level of consumption that can be sustained indefinitely without diminishing the asset stock*”. Blignaut and Hassan (2001) related this concept to the minerals industry by stating that, ‘*although natural (mineral) asset stocks cannot be maintained because of their depletable (wasting) nature, their capacity to generate the same stream of income in the future remains intact*’. This approach requires that a portion of the rents be reinvested in order to provide for a sustainable income.

There is a perception that economic growth on its own will solve many of the problems experienced in the region. However, the international experience has shown that economic development often ignores people and it is only if poverty is alleviated that one can say economic growth is successful and sustainable. Government policies should integrate economic growth with people issues through good governance, democracy, providing opportunities for all people to participate in the economy and by protecting the environment. Weaver et al (1997) observed that: “*When growth is pursued at the expense of equity, it dooms*

large numbers of people to misery. When growth destroys the environment, endangers our health, and threatens our descendants' ability to live on this planet, it is difficult to see this as either sustainable or desirable”.

The vision of a better future for all humanity resulted in identifying the three major components of sustainable development, which are as follows:

- ⊕ A healthy, growing economy that continuously rewards investment.
- ⊕ Equitable sharing and wide distribution of the benefits of economic growth. This component impact on the social well-being of the population.
- ⊕ Respect for and conservation of the environment.

## 5.2 Measuring the Southern African region's economic performance

Given the components of sustainable development listed above, the next question that needs answering is: *How is the Southern African region doing in terms of sustainable development?*

### *Component 1: The economy*

The tables below give an overview of the historic and present position in Botswana, Mozambique, Namibia, South Africa, Tanzania, Zambia and Zimbabwe and they form the basis for the discussion in this section.

Weaver et al (1997) listed the various methods of valuing the economy in terms of sustainable development. If these were applied in the context of this study, the methods would be growth per capita, stability of inflation, levels of employment, the state of government accounts and sector shares of GDP for agriculture, manufacturing and mining. This information appears in Tables 3, 4 and 5.

**Before the countries of the Southern African region can move towards a situation where they can sit at the table and enjoy the wealth pie in a sustainable manner, there must *first* be an oven that can sustain a constant heat (components of sustainable development), *second*, ingredients for the pie (mineral rents), and *third*, a recipe according to which the pie must be prepared (government policies).**

**Table 3 General state of economies in Southern Africa (1999)**

Country	GDP (US\$m)	Population (million)	GDP(US\$)/Capita	CPI (%)
Botswana	5 022	1.61	3 119	7
Mozambique	3 877	17.30	224	2
Namibia	3 272 (1998)	1.70	1 730 (1998)	9
South Africa	130 167	43.05	3 024	5
Tanzania	8 066	32.79	246	8
Zambia	3 470 (1998)	10.41	344 (1998)	31 (1998)
Zimbabwe	5 633	13.08	431	58
SADC	157 902 (1998)	192.41 (1998)	821 (1998)	7.7 (1998)
USA	\$8.5Trillion (1998)		31 500 (1998)	1.6 (1998)

Source: Appendix A - Raw data from IMF (2001) & SADC (1999) & www.infoplease.com

**Table 4 Nominal growth of economies in Southern Africa**

Country	Annual growth: GDP <sup>1</sup> (US\$)/ Capita %			Annual Inflation %	Annual growth: Current account <sup>2</sup> /GDP ratio %		
	1970- 1980 <sup>3</sup>	1980- 1990	1990- 1999		1991 - 1999	1970	1980
Botswana	+ 69	+ 13	+ 3	11	n/a	- 10	+ 10
Mozambique	n/a	- 5	+ 12	33	n/a	- 50	- 31
Namibia	n/a	n/a	+ 1	10	n/a	n/a	- 10
South Africa	+ 27	+ 2	- 1	9	- 4	+ 8	+ 3
Tanzania	+ 19	- 4	+ 4	22	- 4	- 13	- 19
Zambia	+ 7	- 5	+ 4	80	+ 18	- 4	- 5
Zimbabwe	+ 17	+ 1	- 4	30	+ 1	- 3	- 2

Note:1 Nominal GDP converted to US Dollars using the average exchange rate for the year

2 The balance of the current account is the difference between country exports and imports

3 Percentage growth of US Dollars per capita over period divided by ten

4 Arithmetic mean of year on year growth over the period

Source: Appendix A- Raw data from IMF (2001) & SADC (1999)



**Table 5 Sector shares of GDP in Southern Africa**

Country	Agriculture (% of GDP)		Mining (% of GDP)		Manufacturing (% of GDP)		Employment <sup>1</sup> %
	1990	1998	1990	1998	1990	1998	1998
<b>Botswana</b> (1990 not available)	4 (1995)	3	33 (1995)	38	5 (1995)	5	27
<b>Mozambique</b>	25	28	0	0.3	14	9	Not available
<b>Namibia</b>	9	9	20	13	14	16	Not available
<b>South Africa</b>	5	4	10	8	26	24	20
<b>Tanzania</b> (1990 not available)	47 (1995)	45	1 (1995)	2	7 (1995)	7	Not available
<b>Zambia</b>	16	6	10	7	34	14	9
<b>Zimbabwe</b>	15	17	4	2	21	14	20

**Note:** 1 The ratio of total employed over population between the ages of 15 and 60

**Source:** Appendix A- Raw data from IMF (2001) & SADC (1999)

In order to allow for comparison, the Gross Domestic Product (GDP) statistics in the three tables above were standardised in US Dollar using the annual exchange rates as they appear in the IMF (2001) statistical tables. Table 3 shows that South Africa is economically the most active country, accounting for about 80 per cent of the Southern African Development Community<sup>6</sup> (SADC) region's GDP. To put things into perspective, the SADC region's total GDP contribution is less than two per cent of that of the United States. These statistics explain the poverty associated with the Southern African region, which is expressed more explicitly in GDP per capita. It is also an indication of how well economic benefits are distributed in the region. Table 3 shows that Mozambique, Tanzania, Zambia and Zimbabwe are very poor with less than \$1US per capita per day. The average for the entire SADC region is just above \$2US per capita per day while the corresponding number in the US is about \$90US per capita per day. Weaver et al (1997) categorised economies as follows: Low-income economies (less than \$700US per capita per year), lower-middle-income economies (US \$700 to ± US \$3 000), upper-middle-income economies (US \$3 000to ± US \$10 000) and high-income economies (above \$ US 10 000 per capita per year). This classification indicates that Namibia has a lower-middle-income economy while Botswana and South Africa have advanced to upper-middle-income status.

The next question to be asked is: *How fast is per capita income growing each year?* Table 4 shows spectacular growth in GDP per capita in Southern Africa for the 1970s (on average 28 per cent), followed by twenty years of static, and for most countries, negative growth. The massive growth during the 1970s for Botswana and South Africa was largely due to *firstly*, remarkably stable and strong currencies and *secondly* in the case of Botswana, low population growth during the decade (See Tables in Appendix A for details). The only country that managed persistent positive growth in GDP per capita is Botswana, which did not experience internal conflict (e.g. as experienced in South Africa, Zimbabwe and Mozambique), was not at war with neighbouring countries (e.g. as was the case in South Africa and Namibia) and had not implemented extreme policies as a symbol of opposition to colonialism (e.g. the nationalisation of the Zambian copper mines).

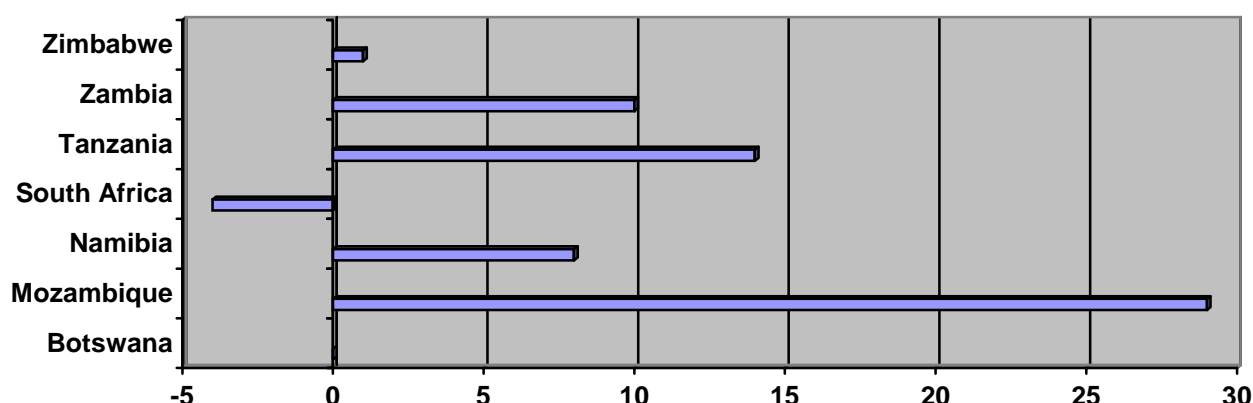
A further component of a healthy economy is stable and relatively low levels of inflation. Table 3 shows that Botswana, Mozambique, Namibia, South Africa and Tanzania managed single digit inflation rates for 1999. Of these countries Botswana, Namibia and South Africa had consistently stable consumer prices for the previous ten years. Zambia and Zimbabwe experienced extreme volatility in their economic indicators, pointing to inappropriate government policies in this regard.

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6 Member countries are Angola, Botswana, Democratic Republic of the Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

The next criterion for measuring economic performance, is to investigate national accounts, more specifically the current (capital) account balance (surplus or deficit) as a percentage of GDP. This statistic shows how successful a country balances its import and export dealings with the rest of the world. Table 4 shows that Zambia's current account was in a healthy state during the 1970s, but declined consistently since then. The main reason for this deterioration was extreme (nationalisation) policies shown world-wide to be unsustainable. The best performer is, once again, Botswana, who managed its policies in such a way as to turn a negative account in 1980 into an (positive) average of ten per cent during the 1990s. Although Botswana and South Africa have managed positive growth in their current accounts, one has to question the sustainability thereof. One way to measure sustainability is to compare domestic investment with export earnings, as illustrated in Figure 4. One would hope that most (at least fifty per cent) of the export earnings are reinvested in the domestic economy in order to sustain future exports. However, this is a condition that is clearly absent for the region. The best performer in this regard is Mozambique, who averaged twenty-nine per cent during the 1990s. The worst performer over the same period was South Africa, whose negative average is an indication of the capital flight that took place over the 1990s.

**Figure 4 Nominal domestic investment (US\$) to export earnings (US\$) ratios as a percentage (Average for 1990s)**



**Source:** Appendix A- Raw data from IMF (2001)

In addition to the economic criteria discussed earlier, a healthy economy has relatively full employment. Formal employment rates in Africa are extremely low and the continent is in desperate need of employment opportunities, as the low GDP income per capita in Table 3 and the employment rates in Table 5 clearly indicate. Government policies in the region should aim to increase employment rates to above fifty per cent. This is achievable when policies are aimed at stimulating growth, especially in the small-scale agricultural and mining sectors. The small-scale sector is known for its ability to distribute economic benefits widely. It provides a whole range of economic, social and environmental services because of its potential for rural employment, enterprise development, food security and consequently, alleviation of poverty. Governments in the SADC region would do well to invest in research aimed at developing these sectors. For the interim, governments should focus on land access policies and capacity building programmes through education.

The final criterion for measuring the economic performance of the Southern African region is structural transformation. Such transformation needs to address many issues, such as an increase in agricultural activity, moving from relatively few crops to a diversified industry with many different crops and agricultural products. The importance of agriculture must not be under-estimated, because empirical evidence shows that this is the sector where benefits are distributed the most widely, meaning that agricultural activity is the first solution in dealing with poverty. Table 5 shows that Tanzania, Mozambique and Zimbabwe derive a large portion of GDP from agriculture. Botswana relies too much on its mineral industry and need to introduce policies stimulating its agricultural sector. Zambia needs to investigate all the sectors in its economy, because agriculture, mining and manufacturing showed a decline of activity during the 1990s. It seems that Zambian policy makers acknowledged this shortcoming because since 1999 the government has made a strategic decision to move away from its centrally owned and planned economy. The current South African land reform in terms of the Restitution of Land Rights Act of 22 of 1994 is aimed at returning ancestral land to the heirs of these indigenous communities. Such access is likely to stimulate the agricultural sector because agriculture and the production of basic foodstuffs are

likely to be the primary activity of these resettled communities. The land reform policy, followed by an Act of Parliament to support the vision of the policy and the implementation of a clear process by the Department of Land Affairs in order to achieve a national goal seems to be a responsible approach to redress land access problems. Zimbabwe's militant stance towards white land owners is unlikely to yield a satisfactory outcome, affecting agriculture, mining and manufacturing negatively.

The next important goal is a gradual shift away from a raw materials-based economy through manufacturing to services, without compromising the agricultural sector. The first step towards this is an education issue, meaning a shift away from uneducated and low-productivity workers to an economy characterized by educated and high-productivity workers. South Africa has diversified its economic activity and has advanced to a situation where the manufacturing sector is the largest contributor to GDP. However, this was achieved at the expense of the agricultural sector. Namibia's economy is perhaps the best balanced of the selected countries. Mozambique, Tanzania and Zimbabwe need to introduce policies stimulating further investment into their mining sectors while Botswana already introduced incentives to stimulate its manufacturing and beneficiation sectors.

### *Component 2: Distribution of benefits*

The success of distributing the benefits of growth among the population can be measured by life expectancy, literacy, education and perhaps more importantly, the United Nations' Human Development Index (HDI). Life expectancy measures the effectiveness of governments' basic (primary) health services, literacy indicates how well a government is preparing its citizens to cope in a literate world, education influences worker efficiency and the HDI is a comparative indicator of governments' ability to deliver the range of social services affecting the quality of life in a nation. From a sustainability point of view, the comparison in the index shows how well countries translate their wealth into social benefits. In the HDI rankings, Southern African countries perform poorly, despite their

abundant mineral wealth. Table 6 shows that only South Africa and Botswana have indices above the developing world, but still lag behind world averages.

**Table 6 Service delivery in selected jurisdictions**

Country	Life expectancy (1994)	Adult literacy rate (1994)	HDI (1994)	HDI World ranking
<b><i>High human development</i></b>	(years)	(%)	(value)	(rank)
Canada	79	99	0.96	1
USA	76	99	0.94	4
<b><i>Medium human development</i></b>	(years)	(%)	(value)	(rank)
South Africa	64	81	0.72	90
Botswana	52	69	0.67	97
Namibia	56	40	0.57	118
Zimbabwe	49	85	0.51	129
<b><i>Low human development</i></b>	(years)	(%)	(value)	(rank)
Zambia	43	77	0.37	144
Tanzania	50	67	0.36	149
Mozambique	46	40	0.28	166
<b><i>All developing countries</i></b>	<b>62</b>	<b>70</b>	<b>0.58</b>	
<b><i>Least developing countries</i></b>	<b>50</b>	<b>48</b>	<b>0.34</b>	
<b><i>Sub-Saharan Africa</i></b>	<b>50</b>	<b>56</b>	<b>0.38</b>	
<b><i>Industrial countries</i></b>	<b>74</b>	<b>99</b>	<b>0.91</b>	
<b><i>World</i></b>	<b>63</b>	<b>77</b>	<b>0.76</b>	

Notes: HDI (Human Development Index)

Source: <http://www.undp.org/hdro/hdii.htm>

### *Component 3: Environment*

The environment is the source of the materials we require for mining. The mining industry is one of the biggest generators of waste products and has significant potential to impact negatively on the environment. Waste production is likely to increase in the future because low-grade/high-volume-deposits are now favoured by

large (international) operators, as opposed to the past preference for high-grade/low-volume-deposits, which are now actively pursued by the small-scale sector. However, waste production is set to increase over time with the depletion of higher-grade deposits. This in itself poses significant doubt about the sustainability of mining benefits because these benefits will at some stage be outweighed by the negative legacy (if uncontrolled) of these waste concentrations.

One way to forecast whether mining in Southern Africa is environmentally sustainable is to look at the environmental laws pertaining to mining. Internationally, most countries have, since the early 1990s introduced some environmental legislation. This is also the case in Southern Africa, albeit that some are still at draft stage, for example Namibia. Some of these states have advanced to the stage where they require reclamation bonds from mining companies (e.g. South Africa and Tanzania) while others are reviewing their policies with the view to introducing financial provision (e.g. Namibia).

Environmental law is no guarantee that the environment will be cared for. A typical example of how environmental law can fail is post-1992 gold mining in the Randfontein-Krugersdorp area in South Africa. The Minerals Act of 1990 introduced environmental best mining practice in 1992, and, despite this law, environmental degradation continued. A large surface mine was created, the overburden material dumped in various localities without rehabilitating these dumps and simultaneously old tailings dams were stripped of their vegetation cover in an attempt to process the tailings in these old (rehabilitated) dumps. Being a marginal gold project, the profits were insufficient to cover environmental expenses and with the subsequent decline of the gold price, mining activities ceased, leaving behind a degraded environment. The question is, *'What can we learn from examples like these?'*

- ⊕ *First*, the process of introducing environmental best practice must be ushered in by environmental education to the mining industry, government officials and local communities, who need to play a more participatory role.
- ⊕ *Second*, government officials need to adopt a rigid approach in ensuring environmental compliance.
- ⊕ *Third*, mining should not be allowed to continue when revenues cannot cover

environmental compliance costs.

- ⊕ *Fourth*, the tax formula for South Africa rewards marginal producers by waiving their tax liability in favour of job creation. The end result is that the government receives little no mineral rent while the national (mineral) asset is exhausted in the process. The ‘reward’ for this failure in tax policy is a polluted area, which burdens the present and very likely, future generations of the local community. Although it is true that formula style of taxation has benefits (e.g. it prevents sudden mine closures, reduces the pay limit, protects short-term employment, etc.), one has to question its appropriateness in the context of sustainable development. Disadvantages of formula taxation are that the system encourages producers operating close to the ‘tax tunnel’ of five per cent to become marginal in an effort to avoid taxes, profitable operations have to cross-subsidise marginal operations and the additional supply keep depressing world prices, starting to affect the more profitable operations.

*More questions than answers.*

In answer to the fundamental questions, the following may be concluded as a result of the information discussed in this section:

- ⊕ *Is mining sustainable?* The answer to this question is that mining is probably not sustainable, mostly because of its depletable nature. Sustainable mineral development can only be achieved when the depletion rate of the resource does not exceed its replacement rate. One may argue that continued exploration will ensure sustainability but, while it is true that the operation’s production may be replaced or sustained, such replacement reserves will seldom be from the same geographic locality as the depleted resource. One way of compensating the local community for their loss is to reinvest the benefits or rents, in consultation and on their behalf, in such a manner that these *economic benefits can be sustained after mining.*
- ⊕ *Has the mineral sector made a positive contribution over time?* The economics tell us that, using mining’s contribution to GDP and especially



foreign exchange earnings, mining has indeed made a positive contribution to the national economies of the Southern African region. Statistics South Africa recently compiled a Poverty Map for South Africa, indicating the poverty areas in the country (StatsSA, 2000). The survey fixed the poverty line at a household expenditure of R800 per month using 1996 prices. An inspection of the map shows that there are two 'rich' provinces, namely Gauteng and the Western Cape. Gauteng's situation can be interpreted as the initial mining activities in the province having been successfully progressed to manufacturing and service industries. Table 7 correlates the information on the map with some of the traditional mining areas in South Africa. The table shows that mining has indeed impacted positively on poverty, compared to other areas, where little or no mining occurred, like for example in the Eastern Cape, which has an average poverty rate of forty-eight per cent.

**Table 7 Poverty in traditional mining districts of South Africa compared with Eastern Cape**

District	Mineral	Remarks
Johannesburg	Gold	Less than 20% of population below poverty line
Welkom	Gold	20 - 40% of population below poverty line
Klerksdorp	Gold	20 - 40% of population below poverty line
Witbank	Coal	Less than 20% of population below poverty line
Kimberley	Diamonds	20 - 40% of population below the poverty line
Rustenburg	Platinum	20 - 40% of population below the poverty line
Eastern Cape	No mining	More than 40% of population below poverty line

**Source: Statistics SA**

⊕ *Did governments distribute the wealth collected from the sector equitably?*

This is a very difficult question to answer. The GDP per capita indicators in Table 3, read with the information in Tables 5 and 6, indicate that Botswana, Namibia and South Africa have performed reasonably in this regard while government delivery in Zambia and, to a lesser extent, Zimbabwe, is questionable, despite significant mineral potential and a long history of mining.

**To summarise:**

- ⊕ *Mining on its own is not sustainable, but the benefits are;*
- ⊕ *The mining industry has the potential to make a positive contribution; and*
- ⊕ *Mineral rents were not optimally distributed in the region.*

## **6 ALIGNING SOUTHERN AFRICAN POLICIES WITH SUSTAINABLE DEVELOPMENT**

The need for foreign minerals investment throughout the developing world has prompted competing countries to design policies that reward the investor with a significant portion of mineral rents. However, these favourable terms may result in a perception at grass roots level that multinationals are enriching themselves at the expense of the natural resource base. The consequence is that host governments are challenged with the immense responsibility of drafting policies that will ensure an acceptable distributional balance among the recipients of mineral rents. Despite a host government's mandate to distribute public rent in the form of services and infrastructure, its own running costs unavoidably absorb a large proportion of rents. The result is that not all the benefits of public rent are passed down to the population when collected at national government level. It is then in the interest of the multinational companies to assume joint responsibility for distributing a portion of the rent to entitled recipients in order to prevent political unrest as a direct consequence of mine development. Apart from sharing the rent with the state, investors can ensure stability by recognising the rights of all legitimate stakeholders. Policy makers will have to investigate optimal sharing ratios with the view to proposing appropriate policy (often fiscal) instruments in order to balance political stability with international competitiveness.

### **6.1 Implications for Southern African governments**

Defining sustainable development is a lot easier than figuring out how to get there. Although markets can be efficient on their own, unregulated markets normally don't lead to social justice and sustainable development. *Governments have to play a central role in ensuring that revenue from mining results in economic and social benefits for all citizens.* Section 5 indicated that Southern African states still experience problems with poor management of resources and inequality of

access and ownership. Environmental laws are often weak, subject to manipulation and sometimes not implemented.

*Historical experience suggests that political stability, whatever the form of government, and the stability of the economic rules of the game, is an important and underrated source of economic growth.*

According to Weaver et al (1997), Sub-Saharan Africa is the only low-income region in the world that has not experienced a substantial increase in income per capita since the 1950s. Africa started on its path from colonial exploitation a generation later than other former colonies in Asia and the Middle East, and many generations later than those in Latin America. At the end of the colonial era, most countries were disadvantaged in terms of infrastructure, development institutions and education. Recurrent drought, internal conflict and war, often fuelled as a consequence of mineral wealth, make it increasingly difficult for the region to attract investment from a global investment community sensitive to the risks posed by the region. *The best way of mitigating these risks is for governments to build capacity for good governance in the region. Good governance by technically competent and accountable officials is therefore the primary consideration.*

**Good governance:**

**The role of central government in creating the physical, legal and social infrastructure that permits markets to function, private firms to operate and community organisations to flourish (Weaver et al, 1997). Anthony Scott, through several of his publications, consistently avers that governments are social creations whose effectiveness is measured by establishing how well they meet the needs of society.**

## 6.2

### Development strategy for Southern Africa

#### **Priority 1: Build capacity**

- 1** To increase government's legitimacy is to increase its governance capacity. The advantage of having a legitimate and democratically elected government is that policies can be more easily implemented with less risk of failure. Weaver et al (1997) provided governments with the following criteria to measure effective governance:
  - ⊕ *Technical competence of government officials*
  - ⊕ *Organisational effectiveness.*
  - ⊕ *Accountability of officials.*
  - ⊕ *Effective rule of law.*
  - ⊕ *Transparency.*
- 2** Governments must invest in people, particularly their primary education and health care, which will make them more productive workers.

#### **Priority 2: Focus economic policies on growth**

- 1** Implement a growth strategy and identify key performance management areas for measuring progress in the balance of payments, government spending, international trade, inflation, etc. The IMF (2000) recommended a strategy for growth in Sub-Saharan Africa after analysing the policies of 32 countries and identifying the key determinants for positive growth rates during the 1990s. Countries in the Southern African region will do well by following the approach outlined and discussed in this well-worded document.
- 2** Stimulate growth by ensuring that income-producing assets (land, labour and capital) are equitably distributed among the population.
- 3** Increase productivity in the small-scale agricultural sector by paying for agricultural research and for converting new technology to suit

local conditions.

- 4 Government policies should provide incentives for promoting economic structural reform through guided transformation of raw materials to manufacturing, with the government playing a key role in getting the industry started. One way to achieve this is through protectionism, whereby tariffs and quotas protect domestic ‘*infant*’ industries. However, protectionist policies are not sustainable because they tend to reduce natural competitiveness and result in expensive local prices for such produce. A more sustainable way is for governments to give incentives (e.g. immediate write-off of capital expenditure and other allowances) to gradually transform the economy from raw materials-based into the production of intermediate (processed and refined goods) to ultimately, final consumer goods. There is also a global implication because the developed world should dismantle all forms of intervention that distort world prices, hurting opportunities in Southern Africa and in particular, that of poor rural communities.

### ***Priority 3: Integrate sustainable development in policies***

The following issues may serve as a base for aligning the minerals sector with the principles of sustainable development:

- ⊕ Efficient use of resources
- ⊕ Raise recycling rates
- ⊕ Account for social and environmental costs

#### ***Strategy:***

- 1 Adopt a people-centred approach with effective stakeholder participation, focusing on capacity development. Sustainability requires (fair and equitable) consensual solutions to conflicts.
- 2 Limit waste production by reusing waste created in one production process in other production processes. However, only a few sectors of the minerals industry (e.g. aluminium) are vertically integrated and

because most mining companies are commodity producers, it could hinder optimal recycling strategies.

- 3 Enforce appropriate mine closure planning in order to reduce the environmental, social and economic legacies of mining, despite the difficulty in finding consensus on funding mechanisms.

**Priority 4: Align mineral wealth with the principles of sustainable development**

Unlike renewable resources, for which optimal resource-use programmes can be designed for sustainable rates of harvesting, wasting assets decline in the absence of new discoveries. Consequently their capacity to generate a constant flow of income and employment is limited (Blignaut and Hassan, 2001). This emphasises the need for effective management of mineral wealth by building the capacity to make the system work. According to Danielson and Lagos (2001), government has to take a central role in assuring that mining “*results in economic progress to the citizenry*”. This may cause tension between federal (national) governments and local structures in rural areas because of ‘*expectation gaps*’ in hopes that the mining project can ensure sustainable development for the region. Over-eagerness by host countries in an attempt to maximise public rent may raise the costs of production to the extent that there is not enough rent remaining to reward the investor, particularly in an environment where real mineral prices for many minerals are continuing to decline.

**Strategy:**

- 1 Develop appropriate sharing ratios for distributing mineral wealth, similar to those discussed in Sections 2 and 3 of this report.
- 2 Compensate future generations for present consumption of mineral wealth by stimulating economic development, such as manufacturing, which is capable of providing the same stream of economic benefits in the future<sup>7</sup>.
- 3 Where appropriate, use the royalty component of mineral rent to compensate the local community and their future generations for the

loss in quality of life as a consequence of resource loss and environmental degradation.

- 4 Mineral resources need to be '*liberated*' and made available to local small-scale (emerging) companies<sup>8</sup>.
- 5 Partner the formal investment community to '*subsidize*' the small-scale sector by allocating resources (financial, expertise and mining rights)<sup>9</sup>.

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7 One way to achieve this goal is to create a separate fund in order to ensure an '*orderly injection of rents into the economy*' (Auty and Brown, 1997). This is especially appropriate when mining makes up a high proportion of GDP, as is the case in Botswana.

8 Organised small-scale mining activity is a solution for people living in poverty, who have unequal access to basic necessities. According to Banuri and Spanger-Siegfried (2001), small- and medium-scale development finance has the potential to create large numbers of sustainable livelihoods.

The Brazilian and Namibian Minerals Act are good examples of how to promote small-scale mining, with certain areas of known mineral potential being reserved for such activity. Access to these '*reserved*' areas is streamlined in terms of easy permitting and special compliance rules, the most important obligation being of an environmental nature.

9 Poorer people lack capital and land and as a consequence, are mostly excluded from many financial services. There are several recent examples in South Africa where partnerships between the government and the private (mining) sector assisted small-scale and black empowerment deals, for example Rexile Investments at Osizweni in Kwazulu-Natal. Rexile went into partnership with Corobrik in order to mine clay and manufacture high quality bricks.

This is a capacity development project where Corobrik will initially assist with management, marketing and environmental compliance. The role of the state is to arrange for finance (through the IDC), to supply assistance with permitting and environmental compliance (DME) and if necessary, mobilise its research services (for example Mintek and Miningtek's involvement at Louisville near Barberton in Mpumalanga) to enhance production efficiencies.

***The stakeholders in mineral development will do well when realising that a larger wealth pie means more benefits, even when sharing ratios decline. Governments in some of the Latin American countries grasped this winning recipe and were rewarded with unprecedented inflows of capital into their mineral sectors.***

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# Appendix

- (A) Economic indicators for Southern African states**
- (B) Simulation models for calculating rent**
- (C) Distribution models**

### **3. A CASE STUDY ON THE PRIVATISATION OF ZAMBIA CONSOLIDATED COPPER MINES**

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## **ABSTRACT**

This report is on a case study on the privatization of Zambia Consolidated Copper Mines (ZCCM). The study reviews the historical background information to privatisation. It also looks at the development of the mining industry in Zambia, the formation of ZCCM and reasons that led to privatisation.

The study undertook a needs assessment survey of privatisation of ZCCM, it critically analyses the privatisation process, the long-term sustainability of the local community, the benefits and lack of benefits that the privatization has resulted in. The report concludes by making recommendations on how flow of mineral rents may be translated into meaningful and visible social development.

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## **TABLE OF CONTENTS**

<b>CONTENTS</b>	<b>PAGE</b>
Abstract-----	iii
Acknowledgements-----	iv
Table of Contents-----	v
1.0 Introduction-----	1
1.1 Rationale of the study-----	1
1.2 Objectives of the study-----	2
2.0 Historical Background Information to Privatisation-----	2
3.0 Rationale for Privatisation-----	5
3.1 ZCCM as a high cost producer-----	6
3.2 Government Mismanagement-----	9
3.3 Privatisation and Increased production-----	9
4.0 Privatisation-----	10
4.1 Aims and Objectives of Privatisation-----	11
4.2 ZCCM Privatisation Team-----	11
4.3 Sell off ZCCM Assets-----	12
5.0 Long Term Sustainable Development-----	13
6.0 Benefits Resulting from Privatisation of ZCCM-----	14
7.0 Lack of Benefits Resulting in Privatisation of ZCCM-----	18
7.1 Social Scan-----	18
7.2 Social Reporting and Information Dissemination-----	24
8.0 Lack of Inflow of Mineral Rents-----	26
9.0 Recommendations-----	29
9.1 The Way Forward-----	29
9.2 Summary of Recommendations-----	31
10.0 References-----	32
Appendix 1: Questionnaire-----	32
Appendix 2: Social Scan Questionnaire-----	34
Appendix 3: Discussion Questions-----	35



## ***INTRODUCTION***

This report discusses the privatization of Zambia Consolidated Copper Mines (ZCCM) and how the mining and minerals sector can best contribute to the transition to sustainable development in Zambia.

Zambia's economy hinges on the copper mining industry and represents the major source of foreign currency revenue. The mining sector contributes about 80 percent to GDP in Zambia [Financial report, 2000] and about US\$ 900m to the National economy.

The mining sector in Zambia provides an economic foundation and most Zambians are either dependant on mining and the minerals sector or are affected by the sector's input to downstream activities.

If the mining and minerals sector and its revenue are managed well, the sector can make significant positive contributions to the national economic and social development. The sector can actively encourage downstream opportunities to derive added economic value.

### ***1.1 THE RATIONALE OF THE STUDY***

Zambia can be regarded as one of the African countries that has a successful privatisation programme. What has not been quantified however is the impact of this programme in terms of the expected welfare or social gains to specific groups of people and the economy at large.

There are still a lot of pertinent questions that have to be addressed. Such questions as; is the country better of now with the privatisation than it was before? Who has gained or who has lost? This study has attempted to put the picture in perspective. This report has therefore, attempted to answer these questions.

## **1.2 THE OBJECTIVES OF THE STUDY**

The specific objectives of this study are to identify:

- a) The benefits resulting from privatization of ZCCM
- b) The lack of benefits resulting from privatization of ZCCM
- c) How inflow of mineral rents can contribute towards sustainable development in Zambia

Identification of benefits and lack of benefits will assist in assessing the impact of privatization on local community and how the mining and minerals sector in Zambia has contributed towards sustainable development.

## **1.0 HISTORICAL BACKGROUND INFORMATION TO PRIVATISATION**

The history of copper mining in Zambia dates back to 1899 when the first mine was discovered. The “modern” history of copper mining industry in Zambia began when sole prospecting rights over large areas were granted to number of financially strong companies in 1923 [Mining Report, 1975].

The Zambia Consolidated Copper Mines (ZCCM) was formed when two large mining companies; namely Nchanga Consolidated Copper Mines (NCCM) and Roan Consolidated Mines (RCM) merged in April 1982 [Figure 1]. Before the merger, the Government took over the running of the two companies when it acquired 51 percent shares in both NCCM and RCM companies.

In 1986, there was a noticeable decline in copper production. The problems in ZCCM resulted in closing of many mining units, and implementation of the five-year production and investment plan in copper mining industry. Despite these measures, the production continued to decline affecting the national economy and social development.

MINING INDUSTRY IN ZAMBIA (HISTORICAL BACKGROUND)

**Nchanga Consolidated Copper Mines (NCCM)**

- Nchanga Copper Mine
- Nkana Copper Mine
- Konkola Copper Mine

**Roan Consolidated Mines (RCM)**

- Roan Antelope Copper Mine (Luanshya)
- Mufulira Copper Mine
- Chambeshi Copper Mine

1969 Government Tookover the Mines: Acquired 51% shares in both NCCM and RCM

April 1982: NCCM + RCM = ZCCM  
Operating Mines of Nkana, Mufulira, Nchanga, Konkola, Chibuluma, Roan and Kabwe merged and formed ZCCM and became the largest mining company in the world.

1986: Decline in Copper Production  
Implementation of the five-year production and investment Plan in Copper Mining Industry (The plan failed).

1991: Change of Government, MMD Party came into power

1992: Further decline in performance of the Zambian Mining Industry.

1993: Preparation to privatize ZCCM  
Privatisation Team was set up

1995: Zambia Privatisation Agency was established

1996: Privatisation Team briefed all ZCCM employees on status quo of ZCCM

1997: The first sale agreement

2000: The remaining ZCCM assets were privatised  
(March 2000: Mufulira & Nkana were privatised)

Figure 1: Historical Background of Zambian Mining Industry

## **2.0 RATIONALE TO PRIVATISATION**

Prior to privatisation, the Zambian copper mining industry's position within the global copper mining industry had deteriorated to low levels [Figure 2]. This was because of both decline in performance of the Zambian industry itself as well as improved performance by various competing international copper products. Factors influencing world market perception of copper producers include:

- a) Reliability of delivery, and
- b) Constancy of quality,

The Zambian copper mining industry enjoyed an excellent international reputation as a producer of consistent high quality copper. Its reliability of delivery however was judged negatively because of poor infrastructure and transport system. The overall perception of Zambian copper was quite positive.

The problems, which led to decline in performance, were operational within ZCCM. After 1985, ZCCM started facing financial constraints. The financial problem became so severe that the company was failing to procure essential implements to use for copper production. Workers were forced to improvise, made short cuts to working procedures and did not only get low salaries but got them late. As a result, employees were demoralised and developed bad working habits. It was apparent that the Government had failed to profitably run the copper mining industry, and to be internationally cost competitive. The reduced capital inflow into the production process, meant that growth, employment creation and revenue accruals to Government were constrained.

The operational problems resulted into low production. For example, Nkana Mine, which was capable of producing about 5 million tonnes of copper ore per annum, was producing about 2 million tonnes per annum [Mining Report; 1990]. Mufulira Mine was capable of producing 2.5 million tonnes of copper ore, was instead only producing about 1.8 million tonnes. The trend was similar with other mines. Despite the low copper production, the overheads remained more or less the

same (at about 39.5 cents/lb) resulting in high cost copper production. The overheads were attributed to costs of non-productive ancillaries, for example, the costs of running the Head office, provision of personal vehicles and services to managers.

### 3.1 ZCCM AS A HIGH COST PRODUCER

As is obvious, higher cost producers are more vulnerable to price downturns than lower cost producers, which are more likely to survive such downturns profitably.

For example, in the 12 months to March 1993, net cash expenditure per pound of finished copper after byproduct credits was 83.1 UScents/lb at ZCCM, compared to Codelco's 73.7 UScents/lb in Chile [Table 1]. However, a general comparison between ZCCM and Codelco is to be treated with caution, given the many differences in geology mining methods, etc, between the two producers. Nevertheless, a closer examination of the cost structures can provide some valuable insights:

Table 1: Cost Structure Overview - (UScents/lb)

	Codelco 1992	ZCCM 1992/93
Operating costs	64.8	67.9
Overall costs (including depreciation)	86.1	107.4
By-products credits	12.9	24.3
Net cost	73.7	83.1

Source: ZCCM Management Report On Operations, Mining Annual Review 1993

Some may be surprised that ZCCM is not severely uncompetitive with Codelco on direct operating costs (67.9 ¢/lb vs 64.8 ¢/lb) [Table 1]. The disadvantage ZCCM has was found in the costs, which were additional to direct operating costs (39.5 ¢/lb vs 21.3 ¢/lb – almost double). This may suggest that it was indirect costs at ZCCM which were compromising its international competitiveness.

Table 2: A summary of selected production data for 1993, and the net cost of production average from 1989 to 1993, are provided.

	<b>Copper (tonnes)</b>	<b>Cobalt (tonnes)</b>	<b>Costs (US\$/lb)</b>
Nchanga (total)	213.049	2.666	
Lower Ore Body (LOB)	67.929		68.8
Nchanga Open Pits (NOP)	120.197	2.666	76.8
Reclaimed tailings (TAILS)	24.923		127.3
Konkola ( 1 and 3 Shafts)	37.687		110.3
Mufulira (MUF)	64.202		99.9
Nkana (total)	56.622	1.245	
Nkana (NKA)	23.803	485	105.7
Mindola (MIN)	19.171	593	97.4
Chibuluma (CHIB)	13.648	167	86.4
Luanshya	20.772		124.6
Baluba	26.507	868	80.6

Source: ZCCM Annual report.

As can be seen [Table 2], approximately 30per cent of ZCCM's copper production and more than half of its cobalt production come from Nchanga Open Pits (NOP), which should be exhausted some time near/after the turn of the century. New developments, especially large ones such as Konkola Deep, will require several years before reaching full production.

### **3.2 GOVERNMENT MISMANAGEMENT**

The Government is not good at managing business. As shown in the historical background of the Zambian mining industry [Figure 1], the decline in copper production started after the Government had acquired 51 per cent shares in mining

companies. Since the Government was the major shareholder, it had powers to appoint top managers and make company policies.

The poor performance in the mining sector was evidence in all State Owned Enterprises (SOEs). There are many factors, which attribute to Government failure to run enterprises, these include:

- a) Government is responsible for the welfare of its people, and therefore, likely to deviate company's revenue to social sector i.e. to support social services.
- b) Since it runs the civil sector, which is a non-profitable sector, some money may be channeled into it.
- c) Lack of good governance may result into lack of transparency and accountability. This may lead to inefficiency of running business houses, and worst still into 'looting' of company property and misappropriation of funds by government leaders and top management.
- d) Since the Government is in-charge of formulating and implementation of laws, it may be difficult to enforce such laws on its own companies.

### **3.3 PRIVATISATION AND INCREASED PRODUCTION**

The chart below [Figure 2] demonstrates a striking correlation between private activity and the growth of mine copper production between 1987 and 1992 [Figure 2]. The massive increases in production in Chile stem mainly from private sector after a change in government policy [Kienbaum, 1998].

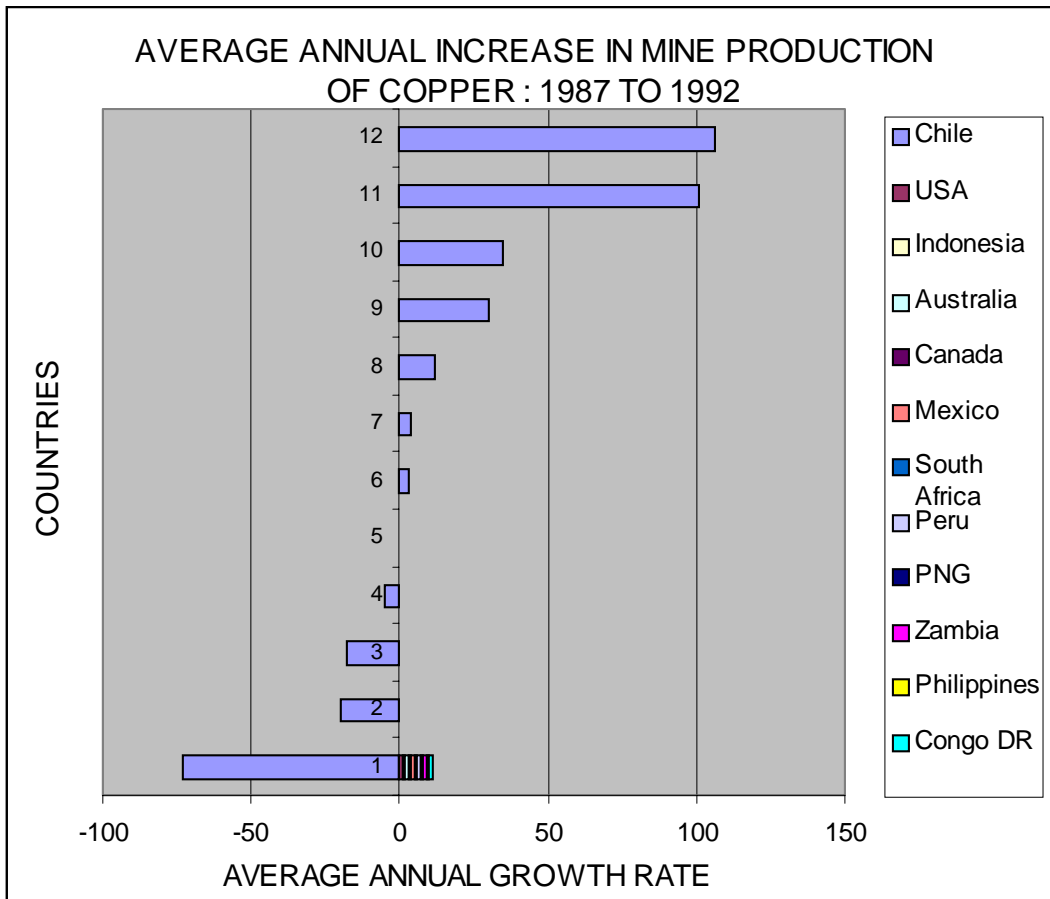


Figure 2: Average Annual Increase in Mine Production of Copper

#### 4.0 PRIVATISATION

The problems in ZCCM led to privatization of its assets. The Government of Zambia realized that revitalization of the Zambian copper mining industry could only be achieved through restructuring involving private investments and participation, since the industry has the potential to substantially increase its production. It was comprehended that long-term economic benefits can be maximized when production is not only increased, but increased together with efficient operation. Only as a cost-competitive producer can Zambia assure itself a proper place on the world copper market.

Privatisation of ZCCM assets was therefore affected as part of an extensive programme of economic reform which began in 1991. The Privatisations Act was enacted in 1992 and the Zambian Privatisation Agency (ZPA) was established in January 1995.



The Government, the International Monetary Fund (IMF) and the World Bank were the architects of Structural Adjustment in Zambia. The architects of economic reform argued that in order for the mining industry in Zambia to compete in global market place and improve in social standards, the mines should be in private hands.

#### **4.1 AIMS AND OBJECTIVES OF PRIVATISATION OF ZCCM**

- a) To stimulate competition
- b) To generate investable funds where companies are sold for cash
- c) To encourage wider ownership of shares (empowerment of Zambians)
- d) To reduce Government budgetary obligations in cases where subsidies were given to parastatals.
- e) To reduce Government involvement in business i.e., to off load the burden of running State owned enterprises so that the Government can concentrate on developmental issues, good governance, poverty alleviation, etc.

#### **4.2 ZCCM PRIVATISATION TEAM**

In 1993, a ZCCM privatisation team was set up. The team had a task of scouting for investors/buyers and to negotiate for conditions of purchase. Apart from scouting for buyers, the team had to consider the impact of the privatisation programme on the people affected. ZCCM Negotiation Team had to:

- minimise redundancies;
- ensure a smooth transition of ZCCM assets to the private sector;
- facilitate new employment opportunities.

In order to prepare itself for these important tasks, the Team requested each unit to answer a questionnaire and to provide information which was useful to be taken into account during the negotiation and sale phases. The team also conducted and participated in various seminars and workshops to inform and educate the public, the unions, the ZCCM employees, the ZCCM managements and the parastatals holding companies of the social aspects of privatisation.

## 4.2 SELL OFF ZCCM ASSETS

The approach towards bargaining and terms of offer to buy the former ZCCM assets by the investors depended on the background and business interest and Government policy and objectives of privatisation.

The bidders came from international mining companies, business houses, consortiums and groups of former ZCCM employees.

The principle privatisation options included:

- a) The sale of ZCCM as a whole with undeveloped resources, financial and environmental liabilities
- b) The sale of ZCCM as a whole without undeveloped resources, financial and environmental liabilities
- c) The sale of ZCCM in packages with resources, financial and environmental liabilities.
- d) The sale of ZCCM in packages without resources, financial and environmental liabilities.

The sale of ZCCM in packages was agreed upon and ZCCM operations were unbundled and sold in units. Financial and environmental liabilities were negotiated for separately for different units and buyers.

In March 1997, the first sale agreement relating to the purchase of Kansanshi Mine by Cyprus Amax Minerals Company of United States of America (USA) was signed, followed by Chibuluma Mine, which was sold to Metorex Consortium [Table 3]. In 2000 the remaining ZCCM assets were privatized. For other ZCCM assets, see Table 3.

Table 3: SALE OF ZCCM ASSETS

Date	Asset	Interest Sold	Buyer	Cash at Close	Deferred Cash	Firm plus conditional commitments
March 1997	Konkola North	Option over	US\$0.5m	-	-	US & 12m

March 1997	Kansanshi Mine	80 – 85%	Cyprus Amax	US\$3m	US\$25m	US\$28m
October 1997	Luanshya/Baluba Mines	85%	Binani Group, Daliah Alabaraka Group, Allenby Finance Ltd.	US\$35m	-	US\$172m
October 1997	Chibuluma Mine	85%	Metorex, Crew Dev. Corp, Maranda Mines, Genbel Securities	US\$17.5m	-	US\$34m
November 1997	Power Division	80%	Cinergy and National Grid Company	US\$50m	-	-
July 1998	Chambishi Mine	85%	China Non-Ferrous Metals	US\$20m	-	US\$70m
September 1998	Chambishi Cobalt Plant & Naka Slag dumps	90%	Avmin Ltd	US\$50m	US\$0.35 m	-
Mach 2000	Mufulira Mine, smelter & refinery & Nkana mine & cobalt plant	90%	Glencore International and First Quantum Ltd	US\$20m	US\$23m	US\$502m
March 2000	Konkola, Nchanga & Nampundwe mines plus option over Nkana smelter/refinery	80%	Zambia Copper Investments Ltd, IFC and CDC plc	US\$30m	US\$60m	US\$731m

## **5.0 LONG-TERM SUSTAINABLE DEVELOPMENT**

Since ZCCM has been privatized and set on the path to revitalisation, the Mining and Minerals sector can now contribute to long-term sustainable development in Zambia. Since the economy in Zambia hinges on the Mining industry, the industry can also play an important role in social development. Social development may be defined as progressive change from lower levels to higher levels or advancement from old to new positions, products, methods and practices. It is the change in the quality and quantity of the people.

Development involves more than just the increase of real income per capita, but has to encompass issues of distributional equity, the well being of the worst off in society, and sustainability. In this regard, the mining and minerals sector can play an important role in realizing development in a nation.

The concept of development, therefore, is operationalised in terms of three basic

dimensions, which are the core defining elements. These are:

- Ensuring survival
- Improving the material living standards of the people, and
- Improving the socio-moral quality of life.

There are many precedents in the mining industry world wide for substantial and continued support for a social service function e.g. in Chile where the sector supports local people through contributions towards improvement of infrastructure and social services.

## **6.0 BENEFITS RESULTING FROM PRIVATISATION OF ZCCM**

The impact of privatisation of ZCCM assets on the economy and social development is an important area that continues to attract debate amongst policy makers and researchers.

In the case of the privatisation programme in Zambia, a number of measures have been instituted to address the social dimension of the privatisation of state owned enterprises through the establishment of a National Social Safety Net (NSSN) in 1993. The NSSN is an autonomous body established by the Government and draws its membership from the private sector, unions and employers.

The NSSN has undertaken needs assessment survey of all employees in the state owned enterprises [Chief Programme Officer, NSSN, 2000]. The results of the survey showed that most employees opted for retraining, and it was apparent that NSSN needed to develop a new framework that would comprehensively address capacity building for employees. It is in this context that the concept of employment and social sustainable development was developed.

The concept embraces diversification of the economy to include training of former ZCCM employees in the areas of agriculture, small business enterprises and local business development. These have enabled former ZCCM employees to form small companies, which can bid for jobs and contracts in the Mining and Minerals industries up to date, about 20 such companies have registered with the Mining

Companies and are getting contracts. This has resulted in some ZCCM ex-employees benefiting.

**Other benefits include:**

1. Apart from the companies which have been formed by ex-employees, the mining sector in Zambia has activated other industries, companies and contractors supplying goods and services. This has resulted in job creation for the local people.
2. Privatisation of the mining units has unlocked the potential, which remained dormant due to lack of capital investment and technological innovation. Since the privatisation of ZCCM assets, the mining and minerals sector has been expanding. Some mine workings which were closed have been re-opened. For example, Chambishi, Bwana Mkubwa and Chibuluma Mines have been re-opened by the new investors. The re-opening of the mines has created jobs for the local people and business for local companies.
3. Apart from re-opening of the old mines, new plant and mines have been opened. For example, Chambishi Metals plc (of South Africa) have constructed a new plant at a cost of US\$130 million to treat the Nkana slag for the recovery of cobalt and copper. The plant is expected to produce 4,200 tonnes of cobalt and 6,000 tonnes of copper per annum. Metorex Company has opened Chibuluma South Mine. The mine was opened after investing US\$11.5 million in the operations. The mine, which has created about 300 new jobs, has a production target of 1,200 tonnes of copper a month.
4. With privatisation, the Zambian mining industry is not only expanding, but also gaining its high standards globally. Prior to privatisation, copper production in Zambia was declining by leaps and bounds. The figures for the year ending 31 March 2000 over the past five years show that annual production fell to below 300,000 metric tonnes. Metal productions were

mainly constrained as a result of many years of lack of investment and maintenance. However, production is expected to improve, and in cases the production is likely to double in three years time.

5. The privatisation of ZCCM assets has brought relief on the National Budget. The relief is not because of mineral rents from the mining sector, but because the Government subsidised ZCCM. The Government was spending more than US\$100 million per year to sustain the running of ZCCM operations. Apart from the relief on the National Budget by cutting subsidy to ZCCM, the growth of suppliers has contributed to significant improvement of the national economy.
6. Because of the confidence by the private sector in the efficacy of economic liberalisation, the privatisation of ZCCM has attracted international investors who have further invested in other large projects related to mining industry. For example:
  - a) International investors have resuscitated Scaw, a ball-bearing manufacturing company. Scaw produces bearings, which are used in metallurgical processes.
  - b) Dyno Company (dealing in blasting agents) and African Explosives Company have been revitalized following capitalization.
  - c) Mining equipment Companies dealing in drilling equipment, mine transport and associated accessories have been set-up in Zambia.
  - d) Other Companies, which have attracted international investors are Ndola Lime, Chilanga Cement, Mine Plant Installation, Construction, Medical and Health Care Companies.
7. Because of influx of people to the Copperbelt, and the activation of other industries and companies, the trading in the Copperbelt towns has increased. There is more business for local people.
8. Creation of opportunities for local suppliers and contractors.

9. Some mining companies have embarked on Human Resource Development programme through training. Some companies have started conducting in-house-training and sponsoring employees to established Training Institutions.

The transfer of ZCCM assets from the public (State) owned to private ownership is a “seed sown” for a new impetus in Zambia’s economy. This will bring an era of economic resuscitation and investment opportunities.

It is the hope of every Zambian that with this act of privatising ZCCM assets, a new wave of confidence for a brighter future would henceforth permit Zambian **social** and **economic life**. New confidence that would induce others to come to Zambia and join partnership with the local people. This will mean long-term social sustainable development.

## **7.0 LACK OF BENEFITS RESULTING FROM PRIVATISATION OF ZCCM**

Although the mining industry is on its way to revitalization, and some benefits have started showing up as stated in above [Section 6.0], only few people are benefiting from privatization of ZCCM. So far, the benefits have not yet filtered to the many ordinary Zambians.

ZCCM has been the vehicle through which the Zambian Government has sought to fulfill certain rights especially on the Copperbelt. It operated as a parallel administration in providing all manner of municipal services. It also run schools, hospitals, clinics and other social amenities in mining communities.

ZCCM was considered as a **“big brother”** who provided for most social requirements. With privatisation of ZCCM assets, social services, which were extended to the local communities by ZCCM have been substantially cut back. This was reviewed by social scan during the study.

## 7.1 SOCIAL SCAN

A social scan [Table 4] was carried out to assess the expectations of the local community to privatisation of ZCCM and its impact.

A questionnaire [Appendix 2] was distributed to:

- a. Local community leaders
  - a. Some former ZCCM employees
  - b. Some mine areas residents in Mufulira, Kitwe, Kalulushi, Luanshya and Chingola.

*Table 4: Showing the Results Of Social Scan*

TOWN	NUMBER OF PEOPLE	EXPECTATIONS			SOCIAL IMPACT			INDIVIDUAL BENEFITS		
		HIGH %	AVERAGE %	LOW %	VERY POSITIVE %	POSITIVE %	NEGATIVE %	MANY %	LITTLE %	NONE %
Mufulira	38	47	36	17	0	19	81	11	26	63
Kitwe	61	51	34	15	1	17	82	21	31	48
Kalulushi	21	49	33	18	0	21	79	17	21	62
Luanshya	33	55	32	13	0	9	91	5	26	69
Chingola	47	61	28	11	5	26	69	12	29	59

The scan showed that people had high expectations of the outcomes of privatisation of ZCCM assets. 53 per cent of the people [Table 4] contacted indicated immediate benefits (less than 3 months after privatisation), while 14 per cent had low expectations. The scan also suggested that the social benefits have drastically declined and that local people have not benefited much from privatisation of ZCCM assets. The declines mentioned by the interviewees were of basic nature and included:

- a) Social services such as medical and health care, which were provided by ZCCM.
- b) Education to employees children
- c) Subsidies on School fees, electricity, water and telephone bills



- d) Collection of cabbage and general house maintenance
- e) Transport to and from work, which was free under ZCCM
- f) Funeral assistance to employees, spouses and employees' biological or registered dependants.
- g) Supply of mealie meal (the staple food-flour from maize grains)

The study has shown that there have been little or no tangible benefits to local community. Only two companies have embarked on long-term sustainable social development programmes. In the sale agreement, long-term sustainability of the local community was incorporated, but most mining companies have not come up with policies on social development. The provision of services is important to enhance the public perception of the privatized mining sector.

The immediate impacts of the privatisation have been adverse. The transition period has brought hardship and decline in economic and social development. The Mine Workers Union of Zambia (MUZ) said the period it has gone through since privatisation of ZCCM has resulted in static salaries for the bulk of its members and reduced Union income [Times of Zambia Newspaper, 2001]. The MUZ President said the period had been rough. He said the production difficulties and retrenchments which had been going on since the privatisation of the ZCCM had impacted negatively on the activities of the Union.

***Retrenchments/Redundancies:***

A total of 8,329 employees were made redundant as of 31<sup>st</sup> December 1999. If it is assumed that each employee affected was responsible for the livelihoods of at least five other family members [after Solomon, 1997], this represents a total of 41,645 livelihoods that have been affected. While a miner was in employment, they were entitled, together with their registered dependants to access company provided medical and education services, recreational facilities, sports clubs and essential municipal infrastructure including electricity, water supply and sewerage services. The consequent loss of these social benefits has had a negative impact on the health, education and general well being of the mine communities.

Table 5 indicates that there have been three peak periods in the cycle of ZCCM redundancies. The first peak occurred in the 1994/95 budget year with a high figure of 2,669. This figure was mainly due to closure of Kabwe mine. This was then followed by a figure of 2,182 in the 1995/96 budget year. The redundancies then dropped to a low of 33 during 1996/97. This was an election year and as it was vital for the MMD government to win a second term, the negotiations for the sale of the Nkana/Nchanga package to the Kafue Consortium dragged on with the consequence that no further redundancies could be effected until after the elections. This explains the modest rise in redundancies to 92 in the period immediately following the elections. The all-time high figure of 3,310 at the end of 1999 signaled the completion of sale negotiations for the remaining units.

Table 3: ZCCM Redundancies – 1992 to 1999

Division	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	Total
Nchanga	4	0	0	52	569	0	0	638	1363
Mufulira	0	0	6	183	357	0	28	869	1443
Nkana	0	4	7	600	135	2	0	457	1205
Luanshya	3	8	0	457	228	0	0	0	696
Konkola	0	0	1	133	494	0	0	639	1267
Chibuluma	0	0	0	0	0	0	0	0	0
Kabwe	0	0	0	813	101	31	36	0	981
Nampundwe	0	0	0	0	52	0	0	0	190
NCR	0	0	0	0	0	0	0	180	108
Power	1	1	0	26	0	0	0	0	28
OPC/CSD	0	0	7	142	162	0	2	566	879
CHO	0	1	0	25	84	0	26	33	169
<b>TOTAL</b>	<b>8</b>	<b>14</b>	<b>21</b>	<b>2669</b>	<b>2182</b>	<b>33</b>	<b>92</b>	<b>3310</b>	<b>8329</b>

### ***The Separation Of ZCCM's Commercial And Social Functions***

The decision to sale ZCCM assets by unbundling entailed the separation of ZCCM's commercial and social roles. This has had adverse implications for service delivery in the mine townships. At the time of the ZCCM privatisation, water and sewerage services could not be handed over to the local authorities because the councils were in the process of hiving off the utilities from their operations. Additionally, the institutional capacity to cope with current responsibilities was inadequate and it was

therefore considered unwise to add on to these responsibilities. The best way forward was to set up a wholly separate operation to oversee the water and sewerage systems in the mine townships. With World Bank assistance, ZCCM set up the Asset Holding Company-Mining Municipal Services (AHC-MMS) with responsibility to oversee the supply of water and removal of solid and liquid waste. The management of storm water drainage was first included in the company's portfolio but this was later passed on to the local authorities who have assumed responsibility for drainage, roads and markets, while ZESCO is responsible for the supply of electricity. It is anticipated that this system of dual utility companies running the water supply and sanitation services will run for four years on the Copperbelt after which a decision will be made concerning a merger of the two services.

The RAID report [2000] states that privatization of ZCCM lacked balanced safeguards. Government incapacity, misguided donor support and private sector exploitation has created the condition in which the majority of Zambians are denied their fundamental human rights. The report continued to say privatisation in Zambia lacked transparency and accountability; the diversion of resources from the sales; and the almost complete lack of regard for the immediate negative impacts on the majority of Zambians living below the poverty line.

Zambia's state of being a heavily indebted poor country was one of the main reasons why the donor community and the World Bank and IMF had such influence over the Government Republic of Zambia (GRZ) in dictating the scale, terms and time-scale of one of the most ambitious privatisation programmes of any developing country. Bretton-Wood Institutions took advantage of the ailing mining sector and Zambia's poor economy to get the best out of privatization of ZCCM.

Development assistance was directly conditional on the rapid disposal of the ailing, state-owned enterprises (SOEs). Donors argued that the sales would bring in the much-needed new investment and revitalise the whole economy. In addition, the sale of the decaying mining company, ZCCM, would, Zambians were assured, help to pay off Zambia's debt. Proceeds from the sales and debt relief under the Heavily

Indebted Poor Country Initiative – HIPC, would allow Zambia to start with a clean slate.

Privatisation in Zambia has been regarded by organisations like Transparency International (which monitors corruption worldwide) as “**a looting exercise**”, serious international business journals have reported that public money has been siphoned off into private offshore companies [Transparency International Report, 1999].

Zambia Privatisation Agency (ZPA) noted that management of certain ZCCM units provided themselves extraordinary and excessive benefits in anticipation of privatisation. Public pressure from the donors to sell off ZCCM at a time of falling world demand for copper made it a buyers market. The new investors were able to make demands that GRZ was not able to refuse and the agreements struck are grossly disadvantageous to the majority of Zambians. The needs of the poor were not a high priority in the privatisation process.

Why such hardships and lack of economic and social development after privatisation of ZCCM assets? It is argued that the Government of the Republic of Zambia (GRZ) did not:

- a) Include social policies when formulating privatisation objectives
- b) Assess properly the impacts of privatisation
- c) Attach value to ZCCM assets
- d) Plan well the privatisation process
- e) Create the necessary legislation for an enabling environment
- f) Clearly articulate industrial policy

It is also argued that GRZ was pushed “**against the wall**”, leaving no room to reject the offers, especially after significant setbacks in the sale of ZCCM operations in 1998. At this time, ZCCM had reached a point of insolvency.

## **7.2 SOCIAL REPORTING AND INFORMATION DISSEMINATION**

In a privatisation process of this magnitude, it is vital that the process is not only seen to be open and transparent but is so in actuality. The law governing the privatisation of ZCCM required the Agency responsible to report and inform the public concerning its activities:

1. The Agency was required to publish in the Government Gazette:
  - The names of the approved assets to be privatized;
  - The registered consultants, valuers, lawyers, public accountants, and merchant banks dealing with the privatisation process;
  - The bidders and bid process;
  - The price of shares and any other special conditions of the sale of shares; and any other matters deemed appropriate.
  
2. The Agency was required to submit a six monthly report on the activities to the Minister of Finance who must have tabled the report before Parliament prior to its public release.
  
3. The Agency must have, at the end of June and December each year submitted reports to the Minister giving details of bids received and reasons for preferring the successful bid, and
  
4. The Agency must have held press briefings and public discussing at which members of the public and interested persons should have been advised on various matters touching on the privatisation programme.

One of the criticisms leveled at the process has been in connection with the manner in which the independent valuers, consultants and lawyers were chosen. It is argued that looking at the listings of experts in the Gazette or the ZPA progress reports does not give any indication of the extent to which any one firm or individual is being used. There have been suspicions that the lucrative engagements with ZPA have been circulating among a clique privileged by their social positioning.

Further, details of how much a ZCCM asset sold was originally valued at were not published. This made it impossible for the general public to judge whether the enterprise in question was sold at a fair price. There were also delays in revealing the details of certain deals. For example, Sales Agreements for Luanshya and Baluba mines to the Binani Group of India was signed on 30<sup>th</sup> June 1997; for the sale of Power Division to the Copperbelt Energy Consortium on 6<sup>th</sup> October 1997; for the sale of Chibuluma Mine to the Metorex Group on 31<sup>st</sup> July 1997. However, by the end of the award of the sale to any of the companies concerned were not made public.

The architects of privatisation of ZCCM; namely the GRZ, IMF and the World Bank are aware that more than 85 percent of former ZCCM employees are facing problems to feed, clothe, educate their children and care for their families' health. The architects have not taken any action to mitigate the negative impacts of privatising ZCCM.

The question that remains unanswered is why the IMF and the World Bank did not protest at the violation of the provisions of the privatisation act, designed to prevent political interference in the sales, when ZPA replaced the ZCCM Negotiating Team.

## **8.0 LACK OF INFLOW OF MINERAL RENTS**

Mining and minerals sector can contribute towards social sustainable development by means of mineral rents. The mineral rents can be translated into social development, if the Government has a policy of ploughing back the funds raised from the mineral rents into the community.

The study has reviewed that privatisation of ZCCM assets did not adequately address the impact of flow of mineral rents on social development. Poor performance of ZCCM before privatisation affected the inflow of mineral rents and after privatisation, the rents have not improved because of conditions negotiated for by inventors.

Despite some positive results of significance to the poor, the most notable of which

is the control of hyper inflation-closing the budget gap has been accomplished, mainly by severe cuts in Government expenditure rather than by raising revenue from mineral rents. Between 1991 and 1997, Government expenditure fell from 40 to 27 per cent of GDP. In real terms, it fell by almost a half from 1,019 billion Zambian Kwacha (ZK) to ZK 586 billion over the same period. It is apparent that the budget cuts have had a devastating impact upon social spending as a component of overall Government expenditure.

The reasons for the reduction in the flow of mineral rents after privatisation of ZCCM assets include:

1. The new owners of ZCCM assets negotiated for taxation individually. In all cases, the Government gave in to low mineral rents because:
  - a) The Government of the Republic of Zambia (GRZ) was in a hurry to dispose off ZCCM assets as they were not making any profit and it was draining the state funds through subsidies.
  - b) The GRZ was pushed to sell at low prices and rents by IMF, World Bank and Donor countries.
2. Although the new owners are paying low loyalty and Value Added Tax (VAT) to Zambia Revenue Authority (ZRA), the import duty has been waived for five (5) years effective from the date of sale.
3. Most mining companies have obtained excessive concessions in terms of taxation, royalty payments, and repatriation of profits and have ensured that any liabilities are shouldered by GRZ.
4. The development agreement between the GRZ and new owners provided mining companies with greater protection by exempting them from liability for fines or penalties or third party claims made in respect of the past activities of ZCCM.

The Kienbaum Report [1998] concluded that the IMF and World Bank gave Anglo American/ZCI more protected support in acquiring ZCCM assets at low values and tax as compared to that offered by Kafue Consortium. It is argued that how can the Anglo American be both a bidder and a shareholder (a seller)?

Anglo American has secured a lower level of company income tax in order to improve the internal rate of return from the Konkola Deep Mining Project as it progresses. The tax rate applied is 25 percent in comparison to the normal rate of 35 percent for companies listed outside of Zambia. Based on existing concessions at the time relating to the offset of losses for ten years, it was calculated that any profits would not be taxed until eleventh year of operation. In addition Anglo American has been guaranteed a reduction in the power tariff by almost 20 percent. Finally, mineral royalty has been reduced from an already low 2 percent to 1 percent.

5. Development Agreement with binding legal agreements between the new investors and GRZ were negotiated in secret and they are not public even after the sale.

ZCCM, like any other state owned Enterprise (SOE) belonged to the Zambian people and have a right to information – there is an absolute necessity for GRZ to provide full information on the prices paid for SOEs and explain what has happened to the sale proceeds.

It is well known fact from Parliament reports [1998 and 2000] that:

1. Money has not been paid into Privatisation Revenue Account.
2. There is extreme disquiet with the way the sale of ZCCM was handled (e.g., the Luanshya Mine deal).
3. The public has a right to know who has purchased shares in former ZCCM assets.



It is reported [Parliament Report 1999] that some of the proceeds from the earlier sales of ZCCM assets were used to keep the remaining ZCCM assets afloat cutting drastically the funds for social sector. The cuts affected the many Zambians especially the vulnerable in the community.

## **9. RECOMMENDATIONS**

1. The important lesson to learn from this analogy is that before privatisation took place, competitive environments should have been created. In Zambia's case however, it is interesting to note that the privatisation programme was undertaken within the context of the structural adjustment programme (SAP) which among other things included the liberalisation of the economy. It should be noted that ZCCM was a monopoly or oligopoly, which produced copper and cobalt under very inefficient conditions.
2. Privatisation of ZCCM assets was part of the IMF/World Bank inspired structural Adjustment Programme and therefore left the country without a choice leading to a myriad of objectives. The Government should have clarified the objectives to include the assessment of the socio-economic impact of privatisation.
3. Before privatisation of ZCCM, the GRZ and the investors agreed on some conditions. Both parties agreed to abide by the set conditions. More than 2 years since privatisation of ZCCM, the Government has not put in place mechanism to monitor if the conditions agreed upon are being adhered to by the new mine owners. The Government should set-up a committee of experts to monitor the running of the mining sector and ensure that agreed conditions are abided by.

### **9.1 THE WAY FORWARD**

The GRZ and Mining sector should identify potential methods for an improved contribution towards sustainable social and economic development. Mining and Minerals sector should align its policies towards sustainable development and work

out community based projects. Mining companies can carry out some projects as joined ventures.

The mining and minerals sector should initiate a forum to address issues concerning local community. For example the issue of social development can be tackled by the mining and minerals sector as one group. Different mining companies can reinforce and support each other in order to effectively contribute towards sustainable social development. The forum can identify the levels at which actions need to be taken and decide which actions are appropriate.

The GRZ should come up with financing guidelines for the mining and minerals sector to positively contribute to social development.

## 9.2 Summary of Recommendations for Stakeholder Contribution to Sustainable Development<sup>1</sup>

Issue	Recommendation	Responsible Stakeholder	Time Scale
Low inflow of mineral rents -new owners of ZCCM assets negotiated for low taxation	Formulate policies i.e. make it compulsory for mining companies to invest certain percent of profit into sustainable development projects or funding social sector.	Zambian Government (GRZ) and Mining Sector.	1 to 3 years
Lack of transparency and accountability on the sales of ZCCM assets. Diversion of resources from the sales. Benefits have not fitted to the majority ordinary Zambians	Establish an independent Board to administer resources from mining and minerals sector. To pressurise the Government to be more transparent and accountable	GRZ World Bank, IMF and Zambians.	1 to 3 years
Heavily indebtedness - resources from the mining and minerals sector go to service debts depriving sustainable development in the country	The world bank, IMF and developed countries should consider debt relief for poor countries so that the resources from mining and minerals sector may be channeled into sustainable development.	World Bank and developed countries.	3 to 5 years
High cost production - less revenue resulting in less benefits	The mining sector and stakeholders should support research and development – Need for methods which will reduce production cost.	Mining sector.	1 to 5 years
Privatisation of ZCCM resulted in retrenchments/redundancies affecting standard of living of both former employees and their dependants (multiplier factor of 6)	Former ZCCM employees should be empowered with skills that will contribute positively towards sustainable development - skills in fields like agriculture. Empowerment of Zambians by ownership	Mining sector and former ZCCM employees.	1 to 5 years

<sup>1</sup> Based on the set of goals for sustainable development outlined in the working document

Lack of good governance -no enabling environment or potential opportunities for sustainable development - lack of social policies i.e. translating mineral resources into sustainable development - investing into infrastructure etc.	of shares in the mining business.  Set-up an independent committee of experts to monitor the activities.  The mining Companies should form a forum to address issues concerning local community i.e. social development; identify levels and type of contributions and jointly initiate and invest in community based ventures – different Companies to reinforce and support each other.	GRZ and Mining sector.	2 to 5 years
Lack of local skilled labour – former employees inherited bad working habits from ZCCM.	The mining sector should come up with programmes to train and develop local manpower.	Mining Sector.	1 to 5 years

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## **APPENDIX 1: QUESTIONNAIRE**

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April 26, 2001

Dear Sir/Madam,

**REF: QUESTIONNAIRE ON MINING, MINERALS AND SUSTAINABLE  
DEVELOPMENT IN ZAMBIA.**

**A CASE STUDY ON THE PRIVATIZATION OF ZAMBIA CONSOLIDATED  
COPPER MINES (ZCCM)**

The Mining, Minerals and Sustainable Development (MMSD) was initiated by the World Business Council for Sustainable Development. The Mining, Mineral and Sustainable Development project is an independent process of participatory analysis aimed at “identifying how the Mining and minerals sector can best contribute to the Southern Africa transition to sustainable development”.

The objective of this particular study is to determine whether the privatization of Zambia Consolidated Copper Mines (ZCCM) has benefited the local community, and if it will result in long-term meaningful and visible sustainable social development in Zambia.

In order for us to get a general understanding of privatization of ZCCM and involvement of local community, we would be very grateful if you assisted us by completing the attached questionnaire.

On behalf of MMSD (SOUTHERN AFRICA REGION), I thank you in advance for taking your valuable time on this questionnaire.

Yours faithfully

Sam Kangwa  
Researcher

## QUESTIONNAIRE

PLEASE GIVE YOUR ANSWERS IN THE INDICATED SPACES OR ON SEPARATE PAPER

1. Privatization means:

- a)
- b)
- c)
- d)

2. The reasons which led to privatization of Zambia Consolidated Copper Mines (ZCCM) are:

- a)

3. The privatization of ZCCM has resulted in the following benefits:

- a)
- b)
- c)
- d)

4. The privatization of ZCCM has resulted in the following lack of benefits:

- a)
- b)
- c)
- d)



5. The mining company (\*KCM, Mopani, Chambeshi, Kalulushi, Luanshya, AVIM) has the following long-term sustainability of the local community:  
(\* delete as appropriate)

- a)
- b)
- c)
- d)

6. The following are recommendations on how best the flow of mineral rents can be translated into meaningful and visible social development:

- a)
- b)
- c)
- d)

7. Any other comments on mining and minerals sector in Zambia as related to sustainable development:

## **APPENDIX 2: SOCIAL SCAN QUESTIONNAIRE**

1. The process of privatization of ZCCM was:
  - a) Well understood by the local community
  - b) Fairly understood by the local community
  - c) Not understood by the local community
  
2. The concept of privatization of ZCCM was:
  - a) Accepted by the local community
  - b) Not accepted by the local community
  - c) Misunderstood
  
3. Former ZCCM employees were:
  - a) Adequately prepared for privatization of ZCCM
  - b) Fairly prepared for privatization of ZCCM
  - c) Not prepared for privatization of ZCCM.
  
4. Former ZCCM employees have
  - a) Highly benefited from the sale of ZCCM.
  - b) Fairly benefited from the sale of ZCCM.
  - c) Not benefited from the sale of ZCCM.
  
5. Local suppliers of goods and services to mining and minerals sector have.
  - a) Benefited from the sale of ZCCM.
  - b) Fairly benefited from the sale of ZCCM.
  - c) Not benefited from the sale of ZCCM.
  
6. The mining and minerals sector can:
  - a) Highly contribute to social development.
  - b) Fairly contribute to social development.
  - c) Not contribute to social development.

7. The mining and minerals sector can:
  - a) Highly contribute to local economy.
  - b) Fairly contribute to local economy.
  - c) Not contribute to local economy.
  
8. Social benefits to local community resulting from privatization of ZCCM are expected to be noticed:
  - a) After 3 months of privatization.
  - b) Between 3 to 12 months.
  - c) Between 12 to 24 months.
  - d) After 24 months.
  
9. Since ZCCM was privatized, there has been:
  - a) Tremendous improvement in social development.
  - b) Fairly improvement in social development.
  - c) No improvement in social development.
  
10. Mineral rents should be used for:
  - a) Local (Mine areas) social development.
  - b) National social development.
  - c) National economy.
  - d) a, b and c above.

### **APPENDIX 3: DISCUSSION QUESTIONS**

SOME QUESTIONS ASKED DURING THE DISCUSSION WITH KONKOLA COPPER MINES LIMITED AND MOPANI COPPER MINES LIMITED

1. What are the main contents on social services contained in the sale agreement of Konkola Copper Mines and Mopani Copper Mines?
2. What are social impacts of privatization of ZCCM?
3. Has the company identified how it can best contribute to sustainable development in Zambia?
  - Has the company got a policy on sustainable development?
4. What community-based projects are being carried out by the Company?
  - How are these projects being implemented?
  - How are these projects being funded?
5. What mechanism has been put in place to empower or support ex-miners?
6. What benefits have resulted from privatization of ZCCM?

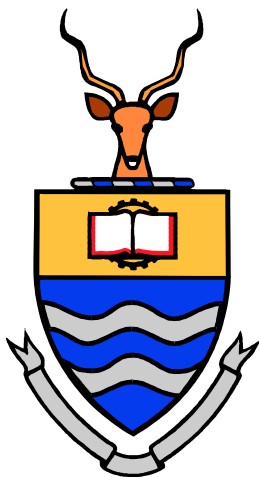
# **4. ENSURING THE MINING SECTORS CONTRIBUTION TO SUSTAINABLE ECONOMIC DEVELOPMENT**

**SEPTEMBER 2001**

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## CONTENTS

Page No.

### PART I

#### SUSTAINABLE DEVELOPMENT: THE MINERALS, METALS AND MINING INDUSTRY

1	INTRODUCTION	
	a. Drivers of change towards sustainability	6
	b. Stakeholders and role players	8
2	THE CASE FOR SUSTAINABLE DEVELOPMENT OF MINERALS AND METALS	8
	a. Hypothetical case: Planning a mining operation in a developing country	9
	b. Inter- and intra-generational equity	11
	c. Consumption	12
	e. Depletion	13
	c. The economic and social consequences of mineral production	15
	f. The challenges and opportunities of mineral economies	16
	<i>Cyclical volatility</i>	
	<i>Application of mineral revenues</i>	
	<i>Economic structure</i>	
	<i>Role-players</i>	

### PART II

#### THE CHALLENGE OF SUSTAINABLE DEVELOPMENT FOR THE MINERALS AND METALS INDUSTRY

1	INTRODUCTION	19
---	--------------	----

<b>2</b>	<b>IMPROVED DECISION-MAKING</b>	<b>20</b>
	a. Policy instruments	23
	<i>Regulation: development, reform and harmonization</i>	24
	<i>Economic instruments</i>	26
	<i>Voluntary action by industry</i>	29
	b. Community consultations	31
	c. Building institutional capacity	34
	d. Strengthening civic institutions	34
<b>2.</b>	<b>SUSTAINABLE OPERATIONS</b>	<b>36</b>
	a. Life-cycle management	36
	b. Mine reclamation	39
	c. Metals Toxicity	41
	d. Metals Recycling Industry and the Safe Use Principle	43
	e. Energy Efficiency	45
<b>3.</b>	<b>MINERALS EXPLORATION AND DEVELOPMENT</b>	<b>45</b>
	a. Mining investments	45
	b. Certainty of mineral tenure	48
	c. Land access	48
	<i>Protected areas</i>	50
	<i>Liaison with landholders</i>	52
	<i>Indigenous peoples land</i>	52
	d. Integrated approach to land use development decisions	53
	e. Taxation	55
<b>4.</b>	<b>MANAGING MINERAL REVENUES</b>	<b>56</b>
	a. Accounting for mineral resources	56
	b. Natural resource accounting and the economic value of mineral resources	59
	c. Natural resource and environmental accounting (NRA)	60
	<i>Physical resource accounts</i>	
	<i>Monetary accounts</i>	

d.	Depletion of natural capital, sustainable income and resource rents	62
	<i>Results of analyses of physical mineral resource Accounting</i>	63
	<i>Results of analyses of monetary mineral resource accounting</i>	64
	<i>Appropriating and allocating minerals resource rents</i>	65
e.	Policies for mineral revenues	65
	<i>Mineral stabilization funds and trust funds</i>	66
	<i>Institutional measures for isolating mineral revenues</i>	69
	<i>Leases and performance bonding</i>	70
5.	<b>SOCIAL INFRASTRUCTURE</b>	72
a.	Workforce	75
	<i>Training and Education</i>	
	<i>Worker health and safety</i>	77
b.	Community Stability	78
	<i>Integration with the local community</i>	78
	<i>Post-mine closure adjustments</i>	80
	<i>New mine development</i>	81
c.	Indigenous peoples participation	82
d.	Indigenous rights and revenue sharing	83
6.	<b>INTERNATIONAL LEADERSHIP</b>	85
a.	Diversification	86
b.	International Cooperation	87
c.	Trade Liberalization	88
d.	Export Promotion	89
<b>PART III</b>	<b>CONCLUSIONS</b>	<b>90</b>

## **REFERENCES**



## List of Figures

	Page
<b>No.</b>	
<b>Figure 1: Comparison of green aspects for different types of mineral deposits</b>	<b>27</b>
<b>Figure 2: Minerals and Metals life-cycle (after NRCan1995)</b>	<b>37</b>

## List of Tables

	Page
<b>No.</b>	
<b>Table 1: Environmental data for managed companies</b>	<b>28</b>
<b>Table 2: Physical and monetary accounts for mineral resources</b>	<b>61</b>
<b>Table 3: Physical resource accounts</b>	<b>63</b>
<b>Table 4: The size and variability of rents captured by governments</b>	<b>64</b>

# **PART I. SUSTAINABLE DEVELOPMENT: THE MINERALS, METALS AND MINING INDUSTRY**

## *1. INTRODUCTION*

### *a. Drivers of change towards sustainability*

Globalization together with environmental awareness and a new sense of social responsibility have characterized the last two decades of the 20<sup>th</sup> century. In 1987 the Brundtland Commission coined the term sustainable development and together with the United Nations Conference on the Environment and Development in 1992 these events marked a period in which there was a transition to a new paradigm that is being examined globally. The concept of sustainable development, namely, *“development that meets the needs of the present without compromising the ability of future generations to meet their needs”* (NRCan (a), 1997, p4) will affect national governments, policy makers, consumers and industry alike about the way they view industrial activity, trade, and the processes of production and consumption.

Over the past decade minerals production in developing countries, has been transformed through liberalization of the investment regimes, restructuring of fiscal and regulatory regimes for mining and privatisation of formerly state-owned mineral assets. This has encouraged foreign investment and led to an influx of mining capital, technology and skills. As a consequence traditional relationships between mining firms, local communities and the Government in many developing countries are also being transformed. This transformation has necessitated a re-evaluation of the most effective mechanisms for improving the capacity of developing countries to maximize the economic and social benefits of mineral production (UNESCO, 1998).

Several factors have tended to operate in harmony to thrust industry towards a greater concern for the way in which business in the mining and minerals sectors is conducted. Greene et al (2001) have identified what they term drivers of change towards sustainable development and among them mention the necessity to ensure a continuing social and political license to operate. This is the continuing acceptance of mining company operations by governments, local communities,

indigenous peoples groups and environmental lobbyists. Political license to operate is said to be an increasingly important factor in business decisions in regard to the development of new operations and license renewals for existing facilities. A further driver of change identified by Greene et al (2001, p. 3) is the negative public reputation of the mining industry for a range of ills they are held responsible for and are expected to address. These include such things as global climate change as well as social and ethical responsibilities such as human rights. They also note that there is operational and market evidence that more efficient industrial processes and environmentally friendly use of inputs have been demonstrated to minimise capital and operating costs and maximise resource productivity. Furthermore share price and shareholder value is correlated with environmental and socially responsible corporate performance. Financial analysts and investors too are making an impression through their perception that poor environmental performers are seen as more risky and hence have less direct access to capital (UNEP, 2001).

According to the investigations of Greene et al (2001), the mining and minerals sector could contribute to sustainable development by improving and changing the:

- Shared knowledge base and common understanding of the issues around which government, industry and stakeholders need to build solutions;
- Underlying values of mining companies, NGO's and communities that are reflected in their corporate responsibility, and the way in which they set societal expectations for mining operations, respectively;
- Ethical behaviour and public reporting of sustainable development performance by companies that demonstrates their adherence to public accountability;
- Decision-making by industry regarding environmental protection and labour issues and by government in regard to the allocation of taxation revenues;
- Allocation of responsibility for community development beyond the mine site amongst voluntary organizations, the company, the community and government, and;
- Development of new industry-community partnerships and trust to monitor and resolve issues arising from the mining operations

**b. Stakeholders and role players**

A range of stakeholders including mining companies, mining industry associations, labour, professional associations, local communities, indigenous peoples, NGO's, the research and academic community, government, international organizations, and the investment and financial service sectors may be required to be involved at different stages of the mine development process. It is likely that the wider community that uses and consumes the mineral and metal products will also have to be involved at some stage of the process.

The mining industry and government have a particularly important role to play in effecting the transition to sustainable development by improving their own operations and promoting change in other organizations. The government is responsible for erecting the structures around finance, planning agencies and ministries that will enable progress towards sustainable development through policies and regulations they put in place.

The agenda for change must be supported by adequate financial and human resources and will have to be clear and transparent, rooted in clear values and with scientifically based criteria for decision-making. Furthermore the key stakeholders and the public at large must understand the agenda while capturing the commitment of key stakeholders to improve performance and accept accountability (Greene et al, 2001, p. 4).

**2. THE CASE FOR SUSTAINABLE DEVELOPMENT OF MINERALS AND METALS**

The goal of sustainable development in the context of minerals and metals is to find, extract, produce, add value to, use, re-use, re-cycle, and when necessary, dispose of mineral and metal products in the most efficient competitive and environmentally responsible manner possible, using best practices (NRCan, 2000). A large percentage of the southern African (SADC) economies are mineral based (generate at least 10 per cent of GDP from mining and at least 40 per cent of their foreign exchange earnings from mineral exports) and mineral production plays a central role

in public policies to promote local, regional and national economic development.

Sustainable economic development for the southern African region requires that:

- Effective mechanisms for improving the capacity to absorb and maintain the economic and social benefits of mineral production be implemented;
- The needs and values of all resource users be respected and that those needs and values be considered in government decision-making;
- The quality of life and the environment for present and future generations be maintained or enhanced; and,
- The involvement and participation of stakeholders, individuals and communities in decision-making be secured.

In order to achieve these goals, five principle issues have to be considered. They include inter- and intra-generational equity, mineral consumption, depletion of mineral resources, the economic and social consequences of mineral production, and the challenges and opportunities of mineral production.

**a. Hypothetical case: Planning a mining operation in a developing country**

Participants in the Mining, Minerals and Sustainable Development (MMSD) Project at a meeting on 'Preparing for Implementation' held in Geneva (2000), developed a hypothetical case to illustrate the complexities of planning a mining operation in a developing country. This was to highlight the diversity of issues in regard to a potential mining operation and the complexity of balancing and prioritising the objectives and outcomes of sustainable development. The issues raised included:

- Distribution of revenues;
- Loss of primary forest;
- Dislocation of local economy;
- Speculating migration, health, crime and the lack of capacity from the local community to face these effects;
- Lack of clarity regarding boundaries of responsibility between different stakeholders;
- Political impact;
- Biodiversity;

- Education;
- Deficiency in regulatory system;
- Alternative developers if the big companies decide not to develop;
- Beneficiation of the new product;
- Intergenerational impact;
- Upstream and down stream linkages and the possibility of local community participation;
- Out migration, disruption of families, and;
- The creation of Governmental capacity in the local area.

While some participants questioned the effectiveness of such an exercise, it is clear that MMSD needs to define boundaries and prioritise issues including the depth to which its studies will go. This is especially important because MMSD has to consider not only future mining operations, but also past and present mining issues. This case study also brought the complexities of multi-stakeholder participation into sharp focus and demonstrated the difficulty of defining the boundaries of responsibility between mining companies and stakeholders who have traditionally taken responsibility for social, environmental and economic concerns. Finally the exercise emphasised the importance of considering implementation from the outset and the need for tailoring recommendations for different issues, regions and processes (Geneva, 2000).

The outcomes of the exercise make it clear that implementation of sustainable development in regard to mining operations is a multi-faceted problem complicated by the interactions of different stakeholders with widely differing agendas. Opinions on how a meaningful contribution to implementing sustainable development on mining operations is to be organised will differ from one researcher to the next. It is however essential and that procedures and practices in keeping with the principles of sustainable development be identified for each of the individual and isolated components of the mining life-cycle. Once these have been critically examined in isolation the component parts of the life-cycle can be drawn together and integrated to form a holistic approach to truly sustainable mining development.

A search through existing literature indicates that there is little doubt that the approach taken by both the private and public Canadian mining institutions is currently at the cutting edge of thinking about how mining and minerals companies should be responding to the challenge of sustainable development. For this reason the approach taken in this study has been to:

- Examine the conceptual framework for sustainable development in the mining and minerals sector;
- Review the lessons learned from other experiences in the minerals and mining sector and;
- To extract the guidelines, methods, principles and governance arrangements that have been suggested in the numerous publications by Natural Resources Canada to improve and help ensure the mining sectors contribution to sustainable economic development and to adapt and modify these for the southern African environment.

**b. Inter- and intra-generational equity**

The disparity among nations and people groups within nations in terms of wealth distribution and the rates of resource consumption is a question of intra-generational equity and a topic of increasing importance in international discussions on how to make sustainable development operational. The Southern African regional community is faced with exponential growth of the population, increasing pressure on the environment, as well as disparities in per capita income and access to limited renewable and non-renewable resources.

Inter-generational equity implies that future generations should not be deprived of resources and wealth because of unsustainable levels of consumption by current generations. The issues take on special importance when non-renewable resource are in question, but it is also relevant to the stresses placed on the environment as a consequence of over production from renewable resources such as forests and fisheries. This could lead to a state where future generations are unable to meet their own needs. Consideration of equity issues within and across generations in the context of mineral production and consumption must take cognisance of the unique characteristics of the resources and the nature of mineral development.

Considering the increasing global demand for mineral products we should ask this generation if equity demands that we forego some mineral developments in order that future generations have something to mine (NRCan, 1995). The simple answer in terms of neo-classical economic theory is explicitly no. This was the answer given by Hotelling in 1932, and not a lot has changed. The point is that the processes of mineral extraction and refining must not leave behind costs to future generations. Even the modern ecological economists would argue that the market price determined extraction rate is acceptable provided all externalities have been accounted for.

### **c. Consumption**

Application of new technologies, advances in science, inter-material substitution and increased concern for energy efficiency have lead to new approaches to the use and recycling of metal and mineral products and reduced environmental stress. Changing social attitudes towards conservation has meant that society is generally reducing overall material consumption of mineral and metals, especially in the industrialised countries.

Economic performance and standards of living in developing countries cannot improve without an increase in the consumption of minerals and metals. Thus the long-term global demand for these resources will grow as populations increase, raising concerns about the long-term availability of natural resources. Solow (1974) responded to the gloomy findings provided in a report to the Club of Rome by Meadows et al (1972). They argued much the same way and were not as naïve as is sometimes suggested, but their findings were heavily castigated. Very few Malthusian analyses have proved useful predictors of future resource shortages. While some minerals and energy minerals are consumed many are not and may be recycled by current or future generations. Thus metals being used or recycled today may have been mined many years ago, but will still be available for use in years to come (NRCan, 1995).

Less mineral development in Southern Africa will not moderate the increasing trend in global consumption of minerals, nor will it heavily impact our local consumption.



Decreases in Southern African production would shift production to other parts of the world without any positive benefits in terms of the sustainability perspective. It would however seriously damage our economic well-being.

#### **d. Depletion**

The future availability of mineral resources is usually referred back to some estimate of currently existing mineral stocks, depending on the paradigm that one uses to consider mineral resource estimation. Taking current consumption rates and existing estimates of resources to arrive at a time when mineral stocks will be ultimately depleted indicates a misunderstanding of the scope and limitations of mineral resource estimation. Ore bodies are subject to both physical and economic depletion. The definition of mineral reserves is an economic concept that only includes mineral deposits that are known and currently economic. Uncertainties associated with trying to predict future demand and prices for a particular commodity and the high cost of exploration mean that ore reserve estimates may vary from a few months to tens of years. This does not mean that the life of the mining operation is limited to the period calculated in the initial ore reserve estimate. Almost all mines will have an estimate that extends three to five years into the future, but it may have been operating for the past fifty years or more, as is the case with many base metal and gold mines (Tilton, 2001).

Mineral reserves are at any time a small fraction of the actual total content of that mineral on the accessible portions of the earth's surface and will depend on several factors. Declines in reserves may result from reduced discoveries, lower commodity prices or increased production costs, while increases in reserves may result from new discoveries, improved geological understanding of the ore body, rises in minerals prices or through the introduction of a new technology that substantially lowers production costs. There is also the process of recovery after use and recycling particularly, of metallic products that adds to overall mineral supply. The processes of discovery, material substitution, increased commodity prices and technological advances have allowed the world supply of minerals and metals to meet the demand (Crowson, 1993).

The use of minerals and metals in applications beneficial to mankind has not been static. Changing patterns of use, demand, technological developments in production and recovery and material substitution are common themes throughout history. A specific mineral deposit will only be developed if there is current or anticipated demand for the mineral that makes it economically viable. The value of a mineral deposit often lies in aspects of the deposit that are beyond human control such as the grade of the mineralization, the easy accessibility of the ore body, recent technological advances or the high price of the commodity, related of course to a high demand for it (Given, 1973). Minerals resources in demand today may not have the same economic value in future. Examples of minerals whose uses have been replaced by other materials include mica, while others previously considered of little or no value, but now in high demand include bastnasite, zinc and by-product gypsum that competes for market share with mined gypsum.

Mineral and metal deposits are also non-renewable in the sense that once they have been physically depleted the mineral will not regenerate. However most minerals and metals are durable and provided that use of the commodity does not require an irreversible change in essential characteristics (as in the case of fuel minerals), they can be recycled. Most metals can be recovered and re-used (if this is economically possible) and added to the physical stock of mineral resources that is passed on to future generations.

Finally it is possible that in our inordinate concern about the aspects of mineral production and use that it is possible to lose sight of the fact that not only will our descendants inherit our pollution and resource depletion, but they will also enjoy the fruits of our labour in the form of human and physical capital, including investments in other natural resources (World Bank, 1992). Thus the economic benefits we enjoy today as a consequence of mineral development are not lost to future generations. Cash flows from such mineral sales allow us to make important and necessary environmental, social and economic investments in the form of infrastructure, schools, libraries, research facilities, safety and health requirements, improvements to the environment that remain to benefit future generations.

There is therefore a strong argument that it will be a considerable time before the world is totally depleted of all available mineral resources, but the most important need is to ensure that the activities of the mining and minerals industry does not place undue stress on the environment and that they support the social objectives of the communities in which they are developed.

**e. The economic and social consequences of mineral production**

The export base model of the natural resource base, originally developed by North (1955) and Teibout (1956), asserts that economies with rich resource endowments can create economic stability and growth by exporting their primary products. Thus minerals production has been identified as an "engine of growth" for the development of local, regional and national economies. According to the model, countries that invest in their natural resources sector by exporting their raw material products while at the same time increasing the economies of scale, and promoting strong regional linkages, will initiate a process of cumulative causation leading to economic growth, stability and diversification. The model further asserts that such a resource-based strategy of industrialization will then create a "spread effect" as a result of developing appropriate linkages between the natural resource sector and the local economy. The range of potential linkages includes:

- Backward linkages to those supplying capital inputs for the sector;
- Forward linkages to those buying output from the sector;
- Final demand linkages to firms supplying consumption goods to workers in the natural resource sector, and;
- Fiscal linkages through taxation, royalties and resource rents.

For many mineral based economies, however, the process of harnessing the economic power of natural resource exports as a means of economic diversification and sustainable growth has been elusive (Box 1). More often than not, the development of the minerals sector has failed to provide the anticipated economic stability, diversification or increased social opportunity (Auty, 1993; Gelb 1988; Sachs and Warner, 1995).

**Box 1: Characteristics of mineral economies****Role Player/Stakeholder: Industry, local communities, business**

- ❖ Cyclical expansions and contraction of activity (boom and bust cycles);
- ❖ Limited employment opportunities outside of the minerals sector, the “overadaptation” of Freudenburg and Gramling (1994).
- ❖ Dependent or "enclave" patterns of development (Freudenburg, 1992);
- ❖ Highly skewed income distribution;
- ❖ Inadequate financial planning for asset replacement;
- ❖ Low revenue retention, and;
- ❖ Under-investment in institutional and social capacity.

Source: UNESCO, (1998).

Contrary to the expectations raised by the export-base model, therefore, a consistent underperformance of mineral economies relative to non-mineral economies has been observed. The extent of that underperformance has been significant enough to lead some commentators to suggest that resource endowment is more of a curse than a blessing (Auty, 1993; Gelb, 1988; Nankani, 1979). Effective policy approaches to maximize economic and social benefits from minerals production will need, therefore, to consider carefully the causes of such underperformance and develop mechanisms that are able to both capture benefits and minimize the costs of dependence on natural resources (UN ESC, 1998).

**f. The challenges and opportunities of mineral production*****Cyclical volatility***

Apart from the physical depletion of a mineral asset through consistent extraction that can seriously affect local communities at a regional level, the principal obstacle to sustained economic growth and stability in mineral economies is the volatility of the revenue stream derived from mineral resource development. This derives in part from the capital-intensive nature of the production function for mining that reduces the ability of the company to respond appropriately to price swings (Auty,

1993). The characteristic volatility of mineral sector revenues can create a series of negative spillover effects for local, regional and national economies based on mineral development. These include the uncertainty of projecting future mineral revenues, a decline in the competitiveness of non-mining tradeable goods known as "Dutch disease" and described by Auty, (1993) and Krugman, (1987), and a cyclical process of windfalls and shortfalls in government revenues that require prudent management if they are not to amplify the tendency to boom and bust (Auty, 1993).

### ***Application of mineral revenues***

The management of the way in which mineral resource revenues captured by the Government through taxation are deployed and applied can impact the development of sustained economic growth and the maximization of social benefits. Revenues received through taxation of mineral resources lose their identity as soon as they are deposited into the general State fund. As a result they become just one of the range of revenue streams that the State allocates to various economic and social activities.

Unlike other revenue streams, mining taxation revenues are usually large and are usually non-recurring. The influx of mineral revenues consequently encourages dependence, causes inflation and distorts the economy (Poole et al., 1992). According to Auty (1993) the economic distortions from mineral revenues are the key impediment to sustainable development in hard mineral economies. The economic distortions (such as Dutch disease) mean that the State has to remedy the damage to the non-mining sector thus reducing the economic efficiency of the mineral sector and precludes investment in capacity-building.

### ***Economic structure***

The tendency towards economic distortion is exacerbated by the fact that modern mining operations tend to be capital intensive, have high capital-to-labour ratios, modest local production linkages and rely mainly on foreign capital. Consequently the strongest linkage between the mining sector and the local and national economy often tends to be fiscal, as opposed to the backward, forward or final demand linkages identified for other economic sectors. Because fiscal linkages are paramount, a central public policy objective for southern African economies should

be the design of institutions (such as stabilization funds) and mechanisms (taxation policy, regulations concerning trust fund management) that buffer the short-term distortions of mineral price volatility and maximize the long-term gains from mineral revenues (Lewis, 1982; Auty, 1993). It is also likely that with decreasing profit margins in important sectors of the mining industry such as gold, that the process of mergers and acquisitions will gain momentum and that more and more of the mining operations will be drawn into the control of the few major mining houses.

### ***Role-players***

The development of mechanisms to contain the economic distortions caused by mineral revenues needs to be a primary objective of efforts to increase the capacity of developing and transition economies to maximize the developmental benefits of mineral production can probably be best addressed by governments as the principle role-player. The responsibility for identifying mechanisms for managing the socio-cultural impacts of mining, creating positive opportunities for training, skill acquisition and social investment, and broadening and diversifying public participation in decision-making at major mining operations are however likely to fall principally to the major mining houses.

# PART II: THE CHALLENGE OF SUSTAINABLE DEVELOPMENT FOR THE MINERALS AND METALS INDUSTRY

## 1 INTRODUCTION

In this section the context for considering how sustainable development may be applied to the minerals and metals industry through guidelines, methods and governance structures is examined. Because the concept is all embracing issues described in this section are often inter-related. The focus here is to examine how the different role players can at various levels promote the goals of sustainable development in a vibrant minerals and metal industry.

There are six specific areas in which issues have to be addressed in order turn the concepts of sustainable development into substantive action with material consequences.

- Improved decision-making
- Sustainable operations
- Minerals exploration and development
- Accounting for mineral resources
- Social infrastructure
- International leadership

The first issue is to ensure that the necessary guidelines for *improved decision-making* are in place. Sustainable development will only become reality when the perspective is moved from institutional matters to addressing issues in an integrated manner (NRTEE, 1995)

The direct impact of mining and mineral operations on the environment are usually substantial, but the four main areas of challenge for the industry in terms of sustainable development, grouped under the heading *sustainable operations*, are mine reclamation, metals toxicity, metals recycling and energy efficiency.

The key issues in regards to South Africa's long-term competitiveness are dealt with under the heading *exploration and development*. Certainty of tenure, land access, protected areas, the uncertainty of land claims by indigenous peoples groups and integrated approaches to land use development decisions are discussed.

The way in which physical and monetary accounts are compiled and the way that mineral resources are valued and accounted for in the overall system of national accounts is examined in the section dealing with *mineral accounting*. The results of physical and monetary accounting in some Southern African countries are discussed.

Sustainable development aims towards the development of social objectives as much as it does environmental and economic objectives. Ensuring the development of a skilled and adaptable workforce, improved working conditions, portability and employment opportunities in the industry are issues at a small scale in terms of the *social infrastructure*. The broader issues include the long-term stability of the mining-dependent community and a greater participation of the indigenous communities and other under represented groups in the industry.

## **2 IMPROVED DECISION-MAKING**

Agenda 21 is considered to be a key document that provides an inventory of environment and development issues that attempts to restructure human thinking and activities in order to integrate the environment and the economy (UNCED, 1993). On this basis it is required at a national, provincial, industrial and social level that the decision-making process fully integrates a consideration of socio-economic and environmental issues with input from a broad range of public perception at an early stage (Box 2). For example it is being suggested that environmental impact assessment, accompanied by equally in-depth social and economic assessments, be undertaken as an integral part of the of regional land-use planning process. This should occur at an early stage rather than waiting for project proposals before the process is initiated.



**Box 2: Integrated land use decisions****Role Player/Stakeholder: Appropriate government office for regional land-use planning**

Integrate environmental, social and economic assessments around known but undeveloped mineral occurrences with regional land-use planning process at an early stage

The second premise on which sustainable development of mineral projects has to be based is the assurance that a projects economic performance will be adequate to ensure that management has the financial capacity to institute practices that will enable the development to comply with the principles of sustainable development (Box 3). This is a fundamental issue that will emerge at the stage of evaluation and valuation of a proposed mineral project. As yet there is no indication of what the cost of compliance for achieving environmental standards is to the industry, but it is likely to be substantial. A suggestion has been made that it could be in the order of 5 per cent of turnover (Ireton, 2001, Personal communication).

**Box 3: Interrogation of the valuation process****Role Player/Stakeholder: Mining or mineral company**

❖ Economic valuation of the mineral project must be shown to provide sufficient product, at sufficiently high grade, over sufficiently long enough period to ensure that the development will generate sufficient revenues to meet the economic, environmental and social criteria for sustainable development in the project-specific locality.

The level of additional cost that compliance and implementation of practices in keeping with sustainable development may add to a project should be considered in all valuations of new projects. For projects in which the valuation indicates that the mineral rents are very likely to be sufficient to cover the green costs and there are no doubts about the long-term ability to make superior returns for the shareholders,

there are few problems. The major concerns are with projects that are likely to render marginal returns when the costs of implementing green policies are factored into the cash flows. If the financial indicators reveal that project cash flows are not able to comfortably accommodate these 'green costs' or that the project is unable to achieve a specified hurdle rate the question then arises as to whether or not the project should be allowed to proceed. If not then who is going to make that decision?

In addition to the scrutiny applied through financing institutions such as the International Monetary Fund, the World Bank and the listing rules at securities institutes (such as the Johannesburg Securities Exchange) the sponsor also interrogates the process of valuation and is responsible for implementation of procedures consistent with sustainable development. Currently all valuation results for companies seeking listing on a securities institute (irrespective of size) are be subject to scrutiny to ensure that elements of the environment and social compliance have been accounted for.

**Box 4: Finance and sustainable development****Role Player/Stakeholder: Project sponsors, financing company**

- ❖ The project sponsor is responsible for carrying out the environmental assessment (EA)
- ❖ The financing company advises the sponsor on the requirements of the EA and the acceptable standards and emission level
- ❖ Financing company undertakes environmental screening to determine the appropriate extent and type of EA
- ❖ The capacity of the sponsor to carry the EA out is assessed
- ❖ Project affected groups and NGO's are consulted about the projects environmental aspects taking their views into account
- ❖ Sponsors disclose meaningful and relevant material to project-affected groups and NGO's in timeous and understandable way.
- ❖ The project is implemented and project sponsor reports on compliance, mitigating measures and monitoring programmes

Source: IFC, 1998.

For larger projects that require some form of external funding the sponsors will be held accountable for the quality of the environmental assessments and standards that are applied in the project. At the stage that financing is approved environmental assessment is completed and standards that ensure compliance with sustainable development are applied (Box 4).

**a. Policy instruments**

In order to achieve the goals of sustainable development regulations, economic instruments and voluntary action are proposed. Three policy instruments presently being employed in the Canadian industry are reviewed below.

### ***Regulation: development, reform and harmonization***

Legislation and regulatory instruments are available and widely used by governments to encourage behaviours in keeping with sustainable development or enforce acceptable environmental practices and protection. With the introduction of the pollution and waste management Draft White Paper it remains for the South African government to determine what policies or combination of policies will be most effective and efficient in achieving environmental, social and economic objectives. It has been suggested that stringent environmental regulations may promote competitiveness in the minerals industry. It has been suggested that an environmental policy appropriate for the minerals industry is one that can be justified on merit and delivers the greenest result for the lowest cost to government, industry and society (The Economist, 1993). Where science based analysis of an aspect indicates the need for application of a specified technology for environmental control it must be implemented in an open, transparent manner that is affordable and based on proven technology (WMI, 1994).

Use of regulations together with enforcement offers the highest degree of assurance that desired standards will be met. The main drawback with this approach is that there is little or no incentive for industry to be proactive or exceed established standards; it is also costly for government to administer. Furthermore prescriptive regulations rather than standards can be inflexible and may not provide the most efficient means of achieving sustainability objectives.

All stakeholders recognise the importance of effective and efficient environmental protection. However the cumulative impact of environmental regulation on a specific mining operations or sectors of the minerals industry should be taken into account. Failure to harmonise over burdensome environmental constraints could inhibit mineral investment. In fact regulatory reform has been cited as a possible means of encouraging a prosperous mining industry that operates on a sustainable basis. Other aspects of regulation that inhibit mineral development are increased costs, uncertainty regarding the interpretation of new regulations and delays that arise from

poorly designed and inefficient regulations; unnecessary duplication was also cited as a factor that could inhibit minerals investment (Box 4; WCED, 199X, p. 12).

**Box 5: Regulation, self-regulation and the environment**

**Role Player/Stakeholder: Government, industry**

- ❖ The most effective and efficient policies or combinations of policies for achieving national environmental, social and economic objectives must be identified.
- ❖ Environmental control must be implemented in an open transparent manner that is affordable and based on proven technology
- ❖ Incentives for self-regulation and environmental compliance in the minerals industry must be promoted through open audit and best practice at mining operations.
- ❖ Over burdensome environmental constraints that could inhibit mineral investment must be harmonised.
- ❖ Aspects of regulation that inhibit mineral development (increased costs, uncertainty regarding the interpretation of new regulations and delays that arise from poorly designed and inefficient regulations, unnecessary duplication) must be identified and corrective action must be taken.

The five items shown in Box 5 provide some basic guidelines for regulating authorities in regard to the implementation of environmental policies that are in keeping with the principles of sustainable development. However South Africa is in an economic and development stage where we should ask ourselves ‘What would be nice to have and what is affordable?’ The task at present is turning concepts and ideas about how sustainable development can be achieved into concrete action, but implementing and monitoring these will require significant manpower resources and finance. The question now remains as to who will meet the costs of carrying out the next step? It is not in our long-term interests to know what to do without being empowered to perform it.

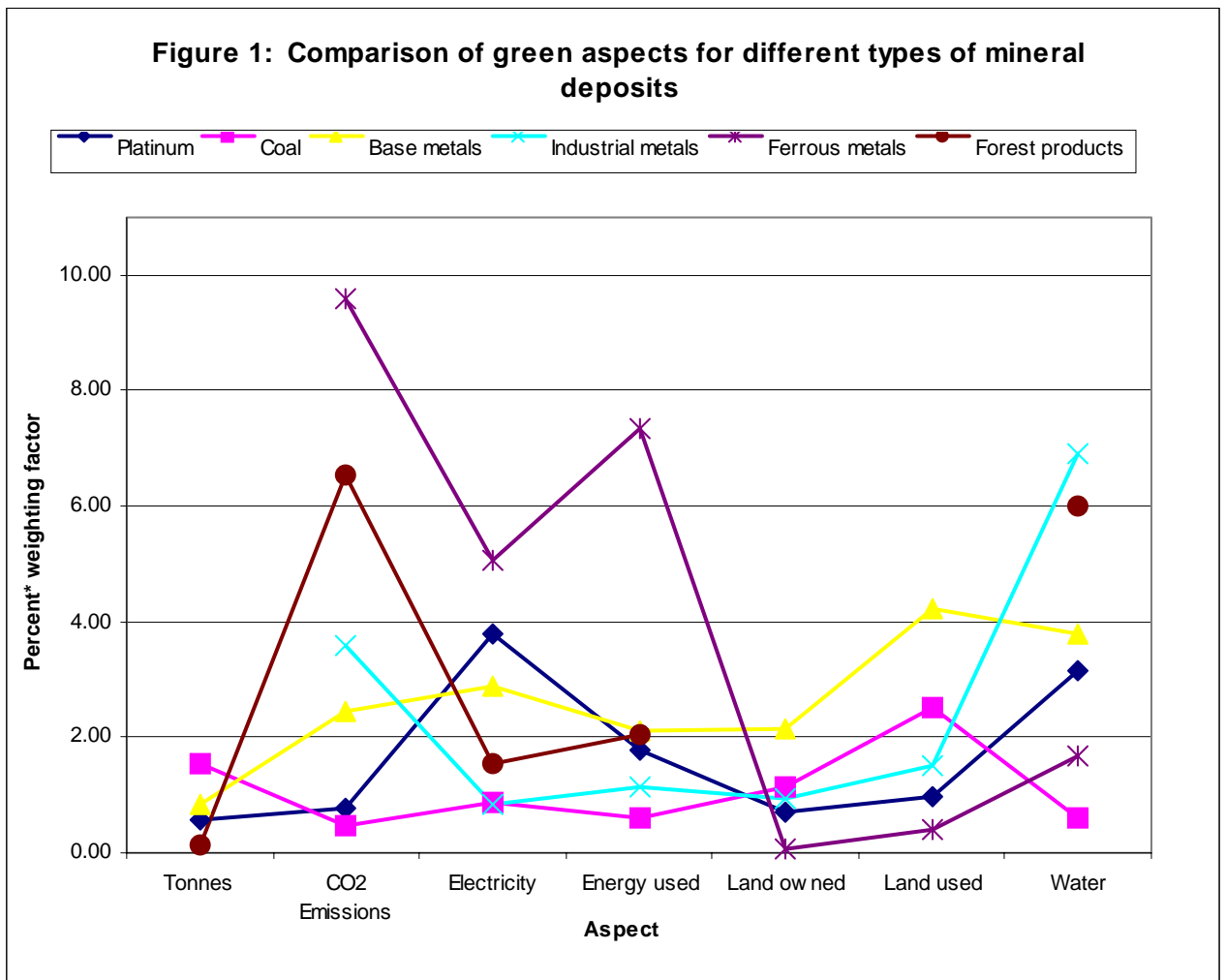
### ***Economic instruments***

Many environmental resources have historically not been assigned market fair market prices because property rights are not assigned to them. Failure to assign property rights and fairly price these resources often leads to their misuse and the transference of external costs to society in the form of lower air and water qualities, reduced land productivity and aesthetic values, and loss of wild life habitat and biodiversity. In other cases prevailing market prices may cover the private cost to the user, but not the external cost to third parties or society at large. These problems remove the incentives for development of cleaner technologies or prevention of environmental damage. An appropriate charge for environmental services could raise the price of these resources to a point where the true value is more accurately reflected and this would in turn positively affect human responses and behaviour in the environment. The difficulty in the application of such instruments is the inability to quantify non-market resource values and to harness market forces to create financial incentives that ensure appropriate care for the environmental resources. Economic instruments can be more cost-effective than regulations and provide incentives for innovation.

Environmental charges, tradeable permits and deposit-refund systems can serve as complements or alternatives to the traditional regulatory approaches. The decision to use an economic instrument, a regulation or the voluntary approach to remedy a particular environmental problem must be evaluated in terms of its effectiveness, competitiveness and fairness.

Canadians are pinning their hopes on the tax system to redress the imbalances associated with environmental externalities and to achieve sustainable development objectives. Equitable tax treatment is proposed for virgin and recycled materials to remove any disincentives to the use of recycled materials (NRCan, 1995).

An analysis of environmental data for managed companies in the Anglo American Plc group of companies as provided in their safety, health and environment report for 2000 does provide an indication of which of the extractive industries may be less environmentally friendly than others.



The data shown in Table 1 shows a comparison of the platinum, coal, base metals, industrial minerals, ferrous metals industries and forest products in terms of tonnes mined/milled (0.05), CO<sub>2</sub> emissions (0.25), electricity purchased (0.15), total energy used (0.15), land under charge (0.05), land used in operations (0.10) and water used for primary activities (0.25). The figures shown in brackets represent the weighting factors applied to the different aspects to a sum of one. Data for the forest products industry was included for interest sake. The weighted factors for each aspect are shown in Figure 1. The more important aspects indicate that the ferrous metal and forest products industries contribute the most to CO<sub>2</sub> emissions, while ferrous metals also uses the most energy as reflected in the high electricity consumption.

**Table 1: Environmental data for managed companies**

<b>Extractive Type</b>	<b>Tonnes</b>	<b>CO<sub>2</sub> emissions</b>	<b>Electricity used</b>	<b>Energy used</b>	<b>Land owned</b>	<b>Land used</b>	<b>Water used</b>	<b>Weighted average</b>
<b>Coal</b>	67469	180	823	5421	86519	14479	4984	<b>0.69</b>
<b>Platinum</b>	24575	302	3528	16261	51922	5560	26505	<b>2.00</b>
<b>Base metals</b>	36353	952	2680	19609	161423.	24335	31882	<b>2.64</b>
<b>Industrial minerals</b>		1398	768	10502	70329	8694	58303	<b>3.24</b>
<b>Forest products</b>	5976	2549	1448	18996	641000	349000	50739	<b>5.01</b>
<b>Ferrous metals</b>		3742	4714	67682	5549	2377	14148	<b>5.15</b>
<b>Totals</b>	134373	9123	13961	138471	375742	55445.	251587	

Source: Anglo American SHE Report 2000.

The most interesting result is the weighted average for the types of mining operations represented in Table 1. The averages indicate that in terms of environmental emissions, resources consumption and land used in the operations that the coal industry is the most environmentally friendly. This is followed in turn by the platinum, base metals, industrial minerals, forest products and ferrous metals in terms of decreasing environmental friendliness and consumption of environmental goods. A fairly interesting observation is the fact that the fact that the base metals and industrial minerals are so close in terms of their consumption of environmental goods in their production. Also of interest is that the forest products and the ferrous metals are significantly the highest consumers of environmental goods in terms of their production. This type of analysis may provide some indication of which mining



operations should be paying more in terms of levies against the use of environmental goods.

### ***Voluntary action by industry***

Governments increasingly view voluntary action by industry as the preferred means of achieving environmental protection. Correctly applied voluntary action can encourage companies to exceed minimum requirements imposed by regulation. Successful application of the incentive requires that companies be allowed the flexibility to meet objectives based on their own planning. For example they are better able to know how changes in production processes can be used to surpass emission standards than an outside agency insisting on the imposing a particular technological solution.

The voluntary action approach to pollution and waste management has not been directly addressed in the Draft White Paper on integrated pollution and waste management for South Africa. It remains an area that will have to be investigated in due course. The Mining Association of Canada became the first mining national mining body in the world to adopt an Environmental Policy specifying that member companies are committed to the implementation of policies supported by *Guides for Environmental Practice* in keeping with the concept of sustainable development, both in Canada and abroad. The countries national and provincial mining associations and the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) have adopted similar environmental policies. Canadian mining companies played an important role in the creation of the International Council on Metals and the Environment (ICME) and are also actively involved in the Accelerated Reduction and Elimination of Toxics (ARET) programme, a multi stakeholder initiative started in 1992 to focus on the voluntary reduction or elimination of toxic wastes by industry. Other joint industry initiatives include the Mine Environment Neutral Drainage (MEND) program that was started in 1998 to address issues concerning acid mine drainage.

Voluntary action by industry could include industry sponsored environmental policy or code or agreement to meet or exceed specific targets that go beyond the

minimum requirement for a specified period of time. In all cases however industry would be required to comply with the stated minimum government compliance requirements.

Voluntary regulation has appeal for both government (the regulator) and industry (the regulated) in terms of cost savings for both parties. However, issues of fairness (size of the companies involved), the role of the local community, and the choice of the means to achieve the desired end most efficiently and effectively, will have to be considered. Government's task is to harness the concept of voluntary action in such a way that the goals of sustainable development can be achieved (Box 6).

<b>Box 6: Business in the Environment</b>
<b>Stakeholders / role players: Industry and government</b>
<ul style="list-style-type: none"><li>❖ Performance can be measured through participation in the Business in the Environment (BiE) index of Corporate Environmental Engagement, that independently monitors progress towards environmental improvement.</li><li>❖ Billiton reports good performance in terms of corporate governance categories but need improvement in stewardship and supplier programmes.</li><li>❖ The index provides an index to shareholders to confirm that companies comply with ethical standards</li></ul>

Source: Billiton, 2000.

It is unlikely that the industry can be left to regulate itself totally independently, but high profile exposure of a mining operations environmental practice and performance through the media provides a huge incentive for compliance in an industry whose environmental conscience has been sensitised. This is exactly what took place at Billiton's Richards Bay Mineral recovery plants and at ISCOR's Saldanha Steel Works during their early years of operation. Both companies

attempted to ignore the highly emotive media reporting of their environmental practise, until the storm had settled. In the opinion of these companies it would simply be business as usual after the environmental lobby had fully expressed themselves and moved on to new targets. That never happened. In fact ISCOR on the advice of RBM took a proactive stance on the issue and began to exceed established standards and beat the environmental activists at their own game. When the lobbyists complained that ISCOR was a few hundred meters short in moving their plant as agreed, they justified it on the basis that their environmental consultants had discovered a new species of fynbos that they were concerned about protecting (personal communication RBM, 1995 and ISCOR, 1996). Their environmental conscience had been sensitised!

Although many developing countries are structuring their tax codes to encourage foreign investment in the mineral sector it is less clear, whether the full potential of fiscal and tax incentives has helped companies to develop local capacity and corporate best practice. By making expenditures on innovation and application of cleaner production technologies tax deductible, firms could accelerate the adoption of cleaner processes as part of foreign direct investment. Similarly, allowing firms to make tax deductions for funds set aside for closure and site reclamation could facilitate proactive clean-up at mine sites, while tax benefits could be provided for investment in secondary (i.e., downstream) processing of mineral concentrates (UNESA, 1998, p. 21). For example, since 1990 Greenland has allowed taxable income to be reduced by 10 per cent annually of investment in secondary processing (Poole et al., 1992). There is also considerable scope for innovative tax policy that would allow companies to make social expenditures in the vicinity of the mine in lieu of taxes (Cooney, 1995).

#### **b. Community Consultations**

Sustainable development demands a wide circle of consultations on environmental and social concerns as well as to the economic concerns, in an integrated manner. Beatrice Labonne (1995) writes

*"It is my contention that continued ignoring of community interests, concerns, and priorities and their exclusion from crucial decision-making as to mining and mineral*

*development produces an inevitable no win situation in which communities – a vibrant renewable resource for sustainable development – are marginalized from economic development” (p.111).*

At the same time there is a growing “voice of society” that demands that the returns from mining capital be more positively seen to contribute to the host country than the elsewhere (Carter, 1999, p. 29). It is the body behind the so-called “voice of society” that has to be identified and that is required to recognise its responsibility in the process of ensuring that any minerals or mining development is sustainable (Box 8).

There are several agencies through which the public can access information on the South African mining industry. The principle sites are those cared for by the government Department of Minerals and Energy, the industry representatives being the Chamber of Mines and labour through the National Union of Mineworkers. NGO’s such as the Minerals Energy and Policy Centre also provide a variety of services and databases from which to inform the public (e.g. Small-scale miners and local communities). Government consults regularly with industry through a number of mechanisms in order to better understand the environment in which its policies will be implemented.

**Box 7: Publicly accessible inventory of information relating to pending minerals and mining developments**

**Stakeholders / role players: Local community leaders and government**

- ❖ Communities faced with the proposition of new mining developments that may affect the locality must set up a watchdog body to monitor progress.
- ❖ Government should undertake to inform local communities of pending mineral and mining developments and make quality information relating to the development available and accessible to the watchdog body.

The ability to identify the relevant stakeholders is critical because some may be more important, more powerful or more influential than others. The value of community involvement particularly in mining related decision-making processes was recognized through the White Horse Initiative. In South Africa community involvement has brought great pressure to bear on some mining related proposals and has at times focussed public attention on specific mining developments such as the St Lucia Bay mineral sands development, Hout Bay Kaolin development and the Saldanha Steel development.

Both industry and government have to make diligent efforts to consult with all legitimate stakeholders who will be affected by their activities and policies (Box 7). In order for the consultations to be effective it is essential that the public not only be made aware of the issues, but that they have access to all the requisite information. It is essential that a database of basic geoscientific, economic data and analysis of the mining related issues be made accessible to the public at large. Furthermore it is essential that basic geological data, information on economic, environmental and social issues and future demand and supply patterns for minerals products that relate to the problem, be made available. An essential component of attaining the necessary impetus for the move towards sustainable development is to raise the profile of mining in South Africa (Box 8). It may be in our interest to follow the Canadian example and introduce a *National Mining Week* in order to focus attention on the mining industry, its role in the economy and its importance to South Africa's future economic development (NRCan, 1995). A further step may be to consider introducing a *Keep Mining in South Africa* initiative and thus inform South Africans about the contribution of mining to their well-being.

<b>Box 8: Key principles for community development programs</b>
<b>Stakeholders/role players: Community members, industry and government</b>
<ul style="list-style-type: none"><li>❖ Consult with community members and key stakeholders</li><li>❖ Build trust</li><li>❖ Clearly define roles</li><li>❖ Develop appropriate capacity</li><li>❖ Mobilize core competencies</li><li>❖ Set measurable goals</li><li>❖ Forge partnerships</li><li>❖ Plan for sustainability</li></ul>



Source: Warhurst (2000)

**c. Building institutional capacity**

Building institutional capacity to effect changes in organisational cultures and practice is required because skills, experience and institutional structures are lacking. New ideas and approaches are required to reflect values and integrated thinking needed to contribute to sustainable development. Raising awareness levels, amongst specific stakeholder groups and developing technical, scientific and managerial skills for individuals, industry or governments is essential. In particular the role of government in promoting and managing mineral development from regulating waste disposal to appropriately distributing mineral wealth is required. Training for professional and technical workers in the minerals industry is of particular importance so that issues of sustainability are identified and resolved by those immediately in contact with them (Greene et al, 2001, p. 12).

**d. Strengthening civic institutions**

Civic institutions are those that promote education, training, community organization and the dissemination and public availability of information. They play a central role in improving a country's capacity to maximize the benefits from mineral production

by providing an interface between government, communities and industry. Such institutions represent a significant forum for dialogue and stakeholder participation in decisions relating to mineral development. These institutions can facilitate initiatives to harness the benefits of mining activity through local participation. If supported by national Governments, such initiatives represent an alternative to the extensive use of regulatory approaches to capturing economic and social benefits (NRCan, 1995).

By involving stakeholders more effectively in participation from the outset, civic institutions can promote collaboration and cooperation as alternatives to political confrontation between industry, government and communities. Creative partnerships at the local level can facilitate the integration of mine development into a wider regional strategy for improving economic and social conditions. The creation of partnerships to promote increased capture of the benefits of mineral production can be facilitated through the development of common tools and methodologies for measuring progress towards sustainable development in mineral economies. By collectively developing and implementing indicators for economic, social and environmental performance, for example, governments, industry, non-governmental organizations and development agencies can create a common framework for measuring and evaluating the benefits of mineral extraction (UNESA, 1998, p. 17).

The feasibility of adopting specific mechanisms to encourage the development of capacity will vary from country to country and even from one mineral project to another. Variation in mineralogical, economic, social and political conditions suggests that blanket prescriptions for capacity building in developing economies are unlikely to be effective. It is possible, however, to identify the generic elements for successful policy approaches to increasing the capacity of mineral economies to maximize the benefits of mineral production. Those elements are:

- To reduce levels of political risk to new investment through appropriate mining laws, a competitive tax system, and transparent, enforceable regulatory codes;
- To manage the volatility of revenue streams in mineral economies;

- To promote education, training, skills development, and cross-training that will improve the resilience of local communities to fluctuations in mining activity through skills that are transferable beyond the mineral sector;
- To assess the benefits to local economies through sharing of mineral revenues, leveraging mining projects, and promoting links between mineral projects and regional development;
- To develop technical and managerial capacities of regulatory agencies through cooperation between industry, government and local communities,
- To strengthen the role of international agreements on social and environmental performance;
- To address the specific concerns of the small-scale mining sector by clarifying the rights, title and access of small-scale miners to mineral deposits, and by developing programmes to enhance the technical and organizational capacity of the small-scale mining sector;
- To facilitate consultation and dialogue between mineral project stakeholders from the outset, encourage central government support for initiatives, develop common frameworks for assessing impacts of mineral operations in terms of their contribution to sustainable development (UNESA, 1998, p. 22).

At the international level mining and metal institutions and associations such as Mining and Environment Research Network (MERN) play an important role. Regional cooperation for developing countries in southern Africa is facilitated through the Southern African development Community (SADC). At the national level mining associations and individual companies may need strengthening in order to contribute towards sustainable development.

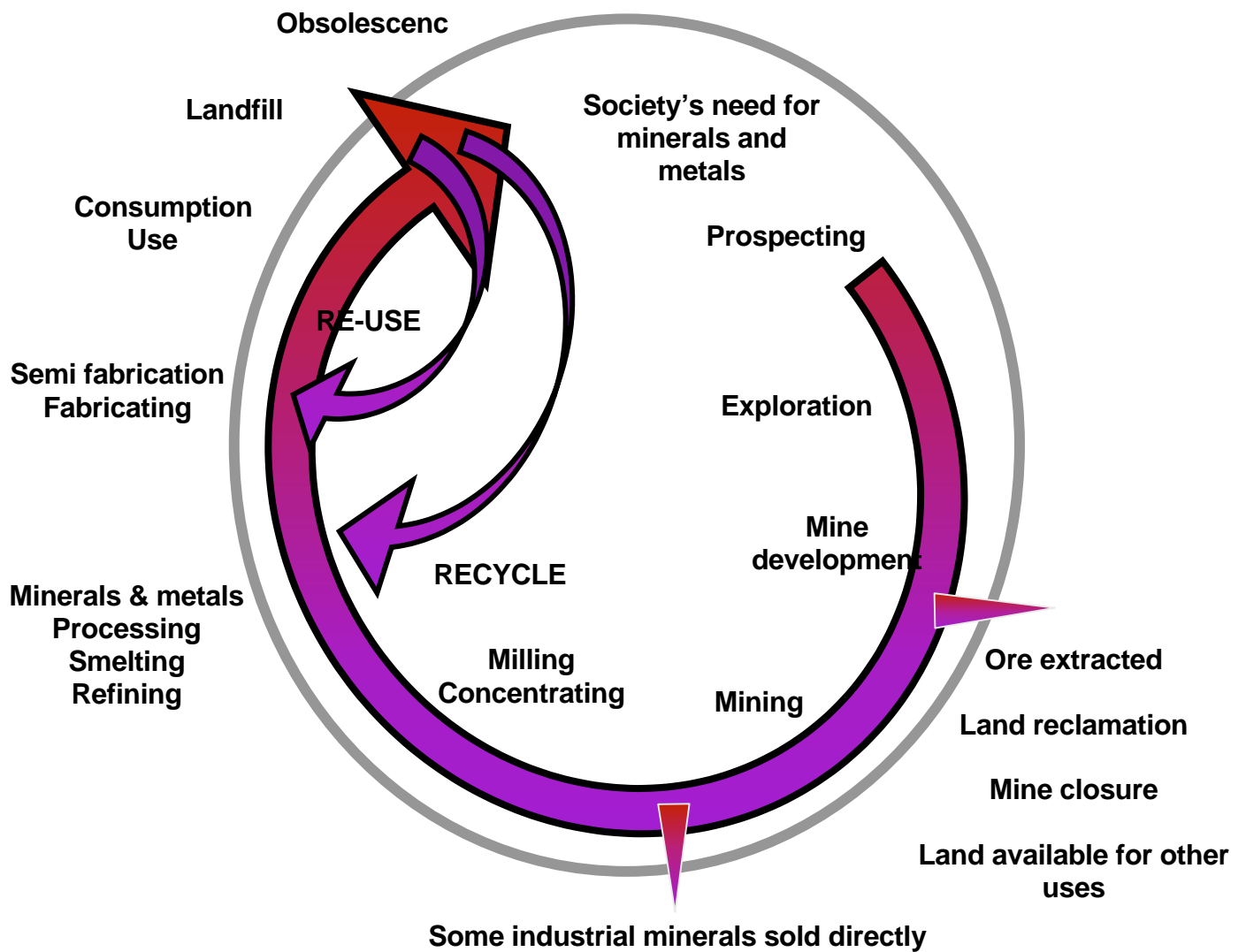
## **2. SUSTAINABLE OPERATIONS**

### **a Life-cycle management**

Life-cycle management recognises that the extraction process and the product both have life cycles that contribute to the development of economic, environmental and social enclaves in significantly different localities that require responsible



stewardship and management if they are to be sustainable. Life-cycle management is the fundamental control of the individual components of exploration, extraction, processing, smelting, refining, waste management, decommissioning and site rehabilitation (Natural Resources Canada, 1997, p5) that ensures optimal stewardship of natural resources. A simple diagrammatic representation of the minerals and metals life-cycle is shown in Figure 2, below. Process life-cycle management applies specifically to individual mineral projects and their associated risks in relation to the production of the commodity. Product life-cycle management involves the products and their associated risks at all stages of manufacturing, use, re-use, recycling and disposal of the product. Of note is the fact that to a large extent the extraction process and the product life cycle occur in significantly different economic, environmental and social localities.



**Figure 2: Minerals and Metals life cycle (after NRCan, 1995)**

The *extraction*, milling, separation and concentrating processes are in most cases contained within a surface area of a few square kilometres. In the case of base metal mines in South Africa there are relatively few mines that smelt or refine their products. Generally concentrates of metals in sulphide form are delivered to specific centres that have dedicated facilities for treating the metallic concentrates. Ancillary products of the extraction process such as air, water, noise and visual pollution may spread of tens and hundreds of square kilometres. The spread of social and community related development is usually within a radius of several tens of kilometres of the extractive industry with a higher population density being found closer to the locus of the extractive activity.

Smelting of metallic sulphide ores is the single step in the metal production process that has the most negative connotations in terms of the level and the toxicity of the associated generation of pollution. Smelting operations at Phalaborwa, O'Okiep and Barberton are all responsible for high levels of toxic sulphidic emissions some of which contain poisonous arsenical elements. Although the effects of the pollution on the surrounding vegetation are evident the long-term low-grade impact on fauna and human life is not as clear.

The industry, government, local communities, the public at large and other stake holders recognise the importance of reducing environmental emissions associated with mining, minerals and metals operations to a minimum. Preventing and minimizing the creation of polluting effluents at source is also seen a substantially more effective and important than end-of-pipe solutions for the industry. Closed – loop systems reduce water use and contamination while clean fuel technologies have greatly improved environmental performance.

If not properly managed environmental impacts associated with mining operations can be substantial even though they are localized. Different environmental impacts are associated with the different stages of mineral exploration and development. The potential effects vary widely depending on the geographic location of the activity, the characteristics of the local ecosystem, climate of the region and the type

of exploration used, size and nature of the mining operation and the ore being mined or processed.

The term 'waste' is employed in the mining industry for material having no economic value. Sand and gravel extraction generate little or no waste whereas rock and ore removed from a gold mining operation constitutes more than 99% waste. Most broken rock waste dumps are benign, not aesthetically pleasing to look at and require correct storage to prevent landslides. Slimes dams require more care in that the rehabilitation is more costly, they are more difficult to maintain, they have to have been known to fail and they may be associated with the formation of sinkholes over dolomitic terrain. Potentially acid-generating waste has to be stored under special conditions to prevent acid drainage and metallic pollution of water streams. In some defunct coal mining operations the acid mine drainage is particularly bad.

Five issues underlie the sustainable development of mining operations. The first of these, managing the mineral revenues, is essentially economic while the other four have a strong technical bias on them and include mine reclamation, metal toxicity, metals recycling and energy efficiency.

### **c. Mine reclamation**

The term mine reclamation covers the total life-cycle of the mining operation from the time that the first sod is turned to the last activity associated with rehabilitation, the goal throughout the life of the mine being to minimise the environmental impact of the mining activities. Mine reclamation is designed to restore to acceptable standards the physical, chemical and biological quality of the environmental resources disturbed by mineral exploration or development and as a consequence has to start before a mine is actually opened. Anglo American have stated that their philosophy is that they are simply borrowing the land, extracting the mineral or metal value and restoring the land for other uses. They aim to demonstrate active stewardship of land, and to prevent or minimise impacts arising from their operations (Anglo American, 2000), p. 35). Land management, responsible stewardship and aftercare are critical for mining and natural resource companies.

The process involves a continuous series of activities that include, planning and undertaking baseline studies, project design and construction, and rehabilitation of the mine site to a viable self-sustaining ecosystem (Box 9). Land disturbance associated with surface mining is more apparent than with underground operations, but both generate significant amounts of waste rock. The storage of the seed bearing overburden, the waste rock and the tailings has a significant impact on the environment. Depending on the nature of the mineralization the seepage from these operations may be acidic and contain heavy metals that could threaten the environment years after the operations have ceased and have been rehabilitated. Environmentally safe tailings dam management together with continuous treatment and monitoring may be required.

**Box 9: Land management and rehabilitation**

**Role Player/Stakeholder: Industry, government and the public**

- ❖ Operating companies are required to manage land use by undertaking progressive rehabilitation wherever possible
- ❖ "...we will ensure we receive accurate information on the total area disturbed which is available for rehabilitation, so that we can set rehabilitation targets for the longer term." (p. 22)
- ❖ All mineral and mining operations should have a closure and rehabilitation plan that is based on on-going rehabilitation work that will provide for a seamless and sufficient closure that is safe and environmentally sustainable.
- ❖ All costs of rehabilitation should be treated as operating cost and therefore require no future provision.

Source: Billiton, 2000 and Anglo American 2000, p.35

All mining operations in South Africa have to obtain the approval of a detailed closure and reclamation plan as part of the permitting process. Mine sites in Canada are no longer abandoned and legislation governing mine closure and reclamation applies to current and future mines. A huge problem in South Africa is

the question of liability for the reclamation of abandoned and orphaned mine sites, particularly coal mines. Orphaned mine sites are those where the mineral rights owner can no longer be identified and mineral rights revert to the state, whereas an abandoned site is one where the mineral rights owner has walked away for any reason.

The liability for funding the reclamation of orphaned mine sites falls to the state, but even where the owner is identified the money to undertake the reclamation may not be available. Differences of opinion over assigning *joint and several responsibility* as a means of identifying responsible parties has limited progress in this matter (WMI, 1994, p. 20). More work is needed to determine the scope of the problem, the resources required to undertake the reclamation at the old mine sites the level of remediation and the applicability of the polluter pays principle.

Where necessary a closure fund should be established to ensure the accumulation of resources over the remaining life of the mine to enable the full and responsible closure of the mine. Known or likely liabilities related to environmental hazards should be regularly monitored (Anglo American, 2000, p.36).

#### **d. Metals Toxicity**

Naturally occurring metals indifferent forms and concentrations that may in trace amounts be essential to life, may under a combination of natural processes and human activity become toxic and harmful to life. The health effects and benefits of metals and their compounds is well documented and extensive government regulations exist for the monitoring and control of exposure to metals and their emissions. In terms of toxicity it is 'the dose makes the poison' statement that recognises that everything is toxic, but details of the DOSE allow one to manage the substance. While the term 'toxic' has been taken to mean damage to organisms, the definition is being expanded to include humans animals and plants.

**Box 10: Billiton environmental incident reporting levels**

**Role Player/Stakeholder: Industry government and the public**

- ❖ **Level I:** Massive non-compliance, with severe adverse and possible irreparable damage, or affecting a large area with major legal implications
- ❖ **Level II:** Major non-compliance excursions with severe damage, costly to repair.
- ❖ **Level III:** Localised non-compliance of material with known toxicity
- ❖ **Level IV:** Major non-compliance and impact
- ❖ **Level V:** Incidents with environmental impact not covered by legislation, particularly spills and other incidents, as per defined volumes.

Source: Billiton, 2000, p.16.

Identifying, assessing and managing risks associated with the process and product life-cycles of minerals and metals is inherent in life-cycle management. Estimates of the degree and likelihood of adverse consequences as a result of the occurrence of an identified risk are assessed (Box 10). By taking account of the economic, social and legal factors associated with an assessed risk and deciding what should be done, the risk can be managed.

The complexity of natural processes and the low levels of concentration of metals means that the assessment of the long term impact on the environment is difficult. Intrinsic hazard assessment does not provide the kind of information needed for sound life-cycle management of specific metallic products, but common-sense risk-based approaches can provide effective and efficient risk-based decisions that are least burdensome to society. Such decisions ensure that metals are used safely and intelligently and that the likelihood of harmful exposure will be minimized.

Initiatives are under way to totally eliminate certain pollutants, such as the virtual elimination of discharges of persistent toxic substances to the environment including hazardous mine effluent. Natural substance released as a result of human activity

may be targeted for reduction to naturally occurring levels with the goal of minimising the environmental impact of human activities, including mining. More field studies are required by industry and government to determine the cumulative impact of the various stages of the mining life-cycle. The AQUAMIN program in Canada is designed to assess the aquatic effects of mining and metal mining effluents on the environment. This is to support the amendments to the national environmental effects monitoring (EEM) program for metal mining.

**e. Metals Recycling Industry and the Safe Use Principle**

Many mineral products and almost all metals can be re-used because of their value, consistent performance characteristics, durability, chemical properties and versatility. Recycling helps to promote conservation, conserves energy and is integral to any sustainable development strategy for minerals and metals. When recycled, metals whose original purposes have been served, once again become raw materials in the production chain without loss of quality and are reintroduced to value-added products. Recycling metals reduces demand for the metallic ores and promotes efficient use of the minerals and metals, conserves as much as 90% of the energy used in primary metal production. Recycling also reduces pressure on landfill sites and diverts potentially hazardous products to new uses and offers potential recovery and access to mineral resources for the future generations (Box 11).

**Box 11: Recycling**

**Role Player/Stakeholder: Government, industry and the public**

❖ Recycling helps to promote conservation, conserves energy and is integral to any sustainable development strategy for minerals and metals. When recycled, metals whose original purposes have been served, once again become raw materials in the production chain without loss of quality and are reintroduced to value-added products.



Metals recycling is a mature, highly efficient and effective, competitive industry in which metals are purchased, processed and sold on a for-profit basis. For some metallic products, namely lead and copper, the estimated recycling rate is above 90%. Important issues in regard to the level and intensity of recycling include the size of the metals-consuming economy, the geographic size of the country, the transportation costs of scrap, and variations in supply and demand.

Means for clear differentiation between recyclable materials destined for legitimate recovery and wastes destined for disposal have to be established. Regulations should be reviewed and removed where restrictions on the movements of recyclable materials is not commensurate with the risks posed by them. Barriers to recycling occur when legitimate and essential raw materials that could be recycled are defined and regulated as wastes for disposal as under the Basel Convention.

Other steps to encourage recycling may include:

- Promoting improved collection programs;
- Supporting technical improvements in separating and recovering metals and minerals;
- Encouraging the use of recycled mineral and metals in products;
- Distinguishing between recyclable materials and those bound for final disposal.

Governments have recognised the importance of a strong and vibrant metals recycling industry both domestically and internationally. The international recycling trade is faced with a problem because metal recyclables are controlled in the same manner as hazardous wastes destined for final disposal because of the way these metals are defined in the Basel Convention (Basel Convention, 1989). Waste is material destined for final disposal or abandoned that can no longer be used for its original purpose and that cannot be re-introduced into the value-added commercial chain. As a result companies cannot access some economic sources of recyclable metals and some valuable materials are sent for disposal in landfill waste sites.

The safe use principle calls for the responsible use and management of the environment and human health factors associated with the production, use, re-use, recycling and disposal of minerals and metals and is closely linked to the application of life-cycle, risk assessment and management principles. In the Canadian application of this principle there is the recognition that some minerals and metals cannot be eliminated from the environment and as such there are products or their uses that pose risks that cannot be managed. As such they become candidates for phaseouts, bans or virtual elimination of releases from anthropogenic sources. The Safe Use Principle also guides development of regulatory strategies to manage risk associated with particular products during production, use, re-use, recycling and return to the environment. Through adherence to the Safe Use Principle governments can ensure that society continues to benefit from the services supplied by minerals and metals products, and at the same time ensure that human health and the environment are protected in a manner consistent with sustainable development.

**f. Energy Efficiency**

The energy intensive nature of the mining and minerals industry means that it is a major consumer of energy and any opportunity to improve its energy efficiency will make it more competitive and enhance the environment. Anglo American (2000, p. 29) is exploring ways of reducing energy consumption, improving mining and mineral processing technology and of measuring and reducing emissions. Reduced energy usage will foster industrial energy efficiencies and economic competitiveness. Together Anglo American and Billiton operations consumed 243713 GJ of electrical power in 2000. This is expected to increase when Billiton's aluminium smelter at Mozal comes into full production.

**3. MINERALS EXPLORATION AND DEVELOPMENT**

**a. Mining investments**

Metals recycling, conservation, inter-material substitution and technological innovation all contribute to efficient use of our natural resources. On their own however these processes cannot meet society's future need for metals and minerals. The discovery and development of new minerals deposits is essential if

the world's demand for minerals and metals is to be met. In order to maintain its position as a leading supplier of mineral commodities to the world South Africa will have to ensure a high degree of sustained investment in mineral exploration and development. There are significant changes that have taken place over the past two decades in the way both industry and governments view mineral exploration. Not all but some of the larger mining houses have taken the view that the effort, expense and risk involved in mineral exploration is not in the interests of their shareholders. Instead they will wait for junior companies to discover mineral deposits and will purchase them after they have been demonstrated to show promise of being developed (Billiton, 2000; Box 12).

**Box 12: Mineral exploration strategy**

**Role Player/Stakeholder: Industry**

❖ We have fundamentally changed the way we undertake exploration. Such activities were previously conducted directly, but now a small team enters into agreements with independent “junior” exploration companies to form equity-based partnerships in areas where prospects meet defined Company criteria. The partner is then responsible for conducting the exploration programme. We have developed standards for HSE reviews, that include social and community issues in accordance with BS8800, which are used in the assessment of this type of project”

Source: Billiton, 2000, p.7.

In a study conducted by Otto and Bakker (1993), prospective geology was identified as the most important factor considered by would be investors in the minerals industry. South Africa's ability to attract foreign investment has in the past depended on its pre-eminent position as a producer of minerals, as well as political stability, cheap labour, infrastructure, and positive investment environment. The reshaping of mineral policy's being undertaken by many developing countries is an indication of the strong competition that exists for the relatively scarce investment dollars. There

has been speculation that the fall in the level of exploration expenditure within South Africa's borders by many of the home-grown mining companies is an indication that the country is losing its competitive edge to attract investment.

Restructuring of investment regimes for mining has been accompanied by a shift in thinking about the way Governments of developing countries can strengthen social, technical and managerial capacities and improve their capacity to capture social benefits from mineral production. Traditionally State-centered strategies are designed to facilitate private enterprise and ensure that market mechanisms deliver capital, technology and skills, while building social, technical and institutional capacity. There is now widespread appreciation of the fact that foreign direct investment received through multinational mining companies deserves particular attention. Such investments are a potential conduit for the development of technical and managerial capacity, the diffusion of best-practice approaches, and the leveraging of social investment. Foreign direct investment in mining, increased dramatically in the last 10 years, but the destination for mineral related investment dollars is to a large extent limited geographically to a relatively small number of countries and to a limited number of particular firms within those countries. The strong competition between countries for investment has meant that Governments can no longer prescribe contractual terms and conditions for the provision of social benefits from minerals production. Thus the capacity of developing economies to capture the social benefits associated with mineral production involve the creation of new partnerships between industry, local people, government, and multilateral development agencies (UNESA, 1998, p. 24).

While South Africa still enjoys the first place in terms of her resources of a number of important metals and minerals, the gold mining and base metal industries are experiencing steadily declining reserves that are not being replenished through additions from resources. This is to some extent a reflection of the exhaustibility of mineral resources, but is also an indication of declining exploration expenditures. An investigation into declining mineral investment in Canada indicated that uncertainties related to land access, certainty of mineral tenure and the onerous environmental regime, are principal causes (NRCan, 1995, p. 45). South Africa is beset with

identical problems and it is unlikely that mineral investment will be unaffected by them if they not addressed swiftly and with a clear solution. The government will have to demonstrate its commitment to ensuring the industry has access to land, fair and certain rules for making mineral investments and that certainty of mineral tenure is assured.

In recent years South Africa's mining industry has developed mineral deposits into mines in a manner that recognises the importance of environmental and social concerns as well as the right of shareholders to earn acceptable returns on investment. Examples include the Ventia diamond mine, the Namaqua Sands heavy minerals mining operation and the Gamsberg zinc mine. The industry relies heavily on the public agencies such as the Council for Geosciences to provide essential services such as the provision of basic geological information, as well as the acquisition and dissemination of geological data for the success of their investments.

**b. Certainty of mineral tenure**

Before investment is made the industry has to have the certainty (through tested government policy and regulation) that it may develop a mineral deposit provided it complies with the relevant permitting and environmental assessment procedures. A well-defined system of property rights is required to ensure that exploration can be undertaken, that investments are secure and that if due processes are followed, production can proceed. Security of tenure is indeed a central theme of the world's successful mining laws and has implications.

Governments too need some latitude in managing public resources during periods of rapidly changing public policy when issues such as land and mineral right ownership and the rights and uses of the land by indigenous people need to be considered. While the investor has to be assured of tenure, governments must be allowed to develop public policy (WMI,1994, p.21).

**c. Land access**

Mining operations generally take up relatively little land space, typically less than one percent (NRCan, 2000. p.8; Anglo American, 2000, p. 37), and although producing mines are found in all provinces, because of the geological constraint on metallogenic provinces there tends to be local concentrations of mineral deposits in specific regions or areas. Mining operations occupy relative little land area, but access to land and mineral resources is becoming increasingly difficult due to competition over what the “best use” for the land might be and to increasingly higher demands of stakeholders and governments. Access has been, and will continue to be a major issue for the South African minerals industry.

The primary goal of environmental management of exploration activities is to prevent unnecessary impacts and reinstate sites where disturbance cannot be avoided. In 1997 the department of Mines and Energy Resources South Australia (MESA) issued a series of Information Sheets (E8 to E 12) forming parts of a volume entitled “Statement of Environmental objectives for Mineral Exploration Activities in South Australia” (MESA, 1997, E8), to assist explorers achieve their objectives. The information sheets do not prescribe what practices should be followed, but rather focus on outcomes leaving the choice of the most appropriate method to achieve the objectives to the explorer. The other information sheets include:

- Environmental Guidelines for Mineral Exploration Field Activities in South Australia (MESA, 1997, E9). These guidelines are advisory only and include notes on how to minimise environmental impacts associated with the location, operation and restoration of access tracks, drilling operations, camp-sites, excavations and sumps, and waste management.
- Aboriginal site Avoidance Guidelines in South Australia, (MESA, 1997, E10);
- Liaison Guidelines for Landholders and Mineral Explorers in South Australia, (MESA, 1997, E11), and;
- Planning and Procedural Guidelines for Mineral Exploration in South Australia, (MESA, 1997, E12).

Mineral exploration is an on going activity that may or may not have a material impact on the environment and local communities. The probabilistic nature of mineral exploration activity is such that programmes are widespread, low intensity

events, typically requiring short periods (one to four years) of easy access to large areas of land for small groups of appropriately trained people. In itself there is little economic activity associated with the process except that there may be some employment of local labour. A problem in terms of the impact on local communities is that exploration activity creates expectations among them that may be difficult to dispel if the exploration is unsuccessful or terminated. The technology used in this exercise is usually portable and leaves no lasting impact on the environment. The digging of trenches or pits could negatively impact the environment, but most jurisdictions require the submission of a complete EMPR before any such work is undertaken, that will ensure that the disturbed land is rehabilitated at the end of the exploration phase. Exploration teams of the larger mining houses are required to respect protected areas as well as culturally and ecologically sensitive areas.

Once the discovery is made, mining uses relatively small areas of land on a temporary basis to recover the mineral resources. Infrastructure in the form of roads, railways, airstrips, water supplies and electrical power lines is essential for most mining activities. Where mineral discoveries are made in remote areas the impact of establishing the infrastructural requirements on the environment may be severe. EMPR reports establish the standards to which land disturbed during mining activity must be restored once the activity has ceased and the land can be reclaimed for other uses.

### ***Protected areas***

Exploration and development may at time come into conflict with alternate land uses because the location of mineral deposits is determined by the geology of a region. Mining history has many examples of deposits being found in regions that had been extensively explored in the past and were thought to have little mineral potential. Imperfect knowledge about the mineral potential of an area may change because of new technologies, improved economics, improved geological theories and luck. Closing of land to development to ensure preservation of biodiversity and ecosystem integrity must be based on science-based decision-making criteria for identifying, selecting and determining the appropriate level of protection of designated areas.

Due consideration must also be given to the foregone economic opportunities associated with mineral development and social impacts.

Article 2 of the United Nations *Convention on Biological Diversity* (1992) defines protected areas to be “a geographical area which is designated or regulated and managed to achieve specific conservation objectives”. The Natural Resources Canada group are working to develop information on land designations as they affect mineral development to provide a perspective on the amount and location of lands closed to mineral activity. Protecting South Africa’s representative areas is essential, but it must be recognized that land for exploration and development is a fundamental requirement of the mining industry (Box 13).

In all SADC states the protection afforded certain areas ensures the representation of natural regions, the protection of biodiversity, specific species or wildlife habitat, preserve ecological integrity and ensure public access to outstanding natural areas for recreation and tourism. The Canadian example of land management ensures that mineral exploration in protected areas may, depending on the level of protection, be prohibited, regulated or managed depending on the conservation objective that has been set. This prevents future generations being denied potential access to natural resources while at the same time meeting environmental objectives (NRCan, 2000. p9).

**Box 13: Biodiversity**

**Role Player/Stakeholder: Government, industry and the public**

- ❖ Closing of land to development to ensure preservation of biodiversity and ecosystem integrity must be based on science-based decision-making criteria for identifying, selecting and determining the appropriate level of protection of designated areas.
- ❖ Due consideration must be given to the foregone economic opportunities associated with mineral development and social impacts.
- ❖ Biodiversity stewardship is principally a voluntary commitment to practices and planning that will help conserve wildlife and habitat



The larger mining companies have recognized the importance of conserving healthy and dynamic natural systems aim to demonstrate active stewardship of biodiversity through the preservation and care of ecologically sensitive and protected areas. Anglo American for example, have sponsored the Mining and Energy Research Network at the University of Warwick which is developing environmental and social performance indicators, and will shortly establish guidelines for biodiversity stewardship and action plans. Although mining companies have demonstrated commitment towards stewardship of biodiversity in relation to mineral development the EMPR requires a full survey of the indigenous fauna and flora in an area designated for future development. Biodiversity stewardship involves the management of land and activities with proper regard for the wildlife, especially wildlife at risk and habitat. Although biodiversity may be regulated to some extent biodiversity stewardship is principally a voluntary commitment to practices and planning that will help conserve wildlife and habitat. The ecological interest groups in South Africa include the Botanical Society, Wildlife Society Succulent Society and Cape Nature Conservation, organizations that are in regular dialogue with mining companies that operate in environmentally sensitive areas. Venitia diamond mine is integrating wildlife planning and habitat conservation into their project planning, mine development and closure planning, while Richards Bay Minerals has already been doing this very thing for several years.

### ***Liaison with landholders***

Good relationships between landholders and those involved in mineral exploration are based on each party understanding the interests of the other. The Minerals Bill allows mining companies and prospectors to access the land for exploration purposes, it also recognises the rights of the landowners. Mines and Energy Resources South Australia have produced a set of guidelines to promote communication and establish good working relationships between landholders who have surface rights and explorers who are authorised to enter land to search for mineral deposits. MESA (1997) have provided guidelines in regards to establishing and maintaining good relationships prior to entry on to the land, the appropriate

actions upon first arriving on the land, issues regarding landcare, property infrastructure, good housekeeping, management of exploration activities, reinstatement of disturbed area, and actions to be taken after the completion of the programme.

### ***Indigenous peoples land***

Indigenous peoples have rights protected under the Constitution of South Africa. The Restitution of Land Rights Act seeks to restore the rights of indigenous peoples to their land. Typically in the past mineral developments have proceeded without direct participation or with due regard to the consent of indigenous or local communities. Many land claims are unresolved or unrecognised at present and remain to be negotiated and the large number of claims indicates that complex land management issues are likely to arise. Such uncertainty compounds the process for obtaining a decision on mineral development and could adversely affect the investment climate.

Promoting good relationships with local communities of which mining companies become a part requires that the company be transparent and accountable to a wider range of stakeholders than in the past. Company values and principles should demonstrate that business is to be conducted in a spirit of good neighbourliness that promotes the prosperity and stability of local communities.

Prior to commencement of exploration activities, it is important that explorers be aware of the legislation that protects aboriginal sites, objects and remains. Aboriginal peoples with traditional knowledge of the area can identify many of these sites of cultural significance. Aboriginal archaeological sites (middens) can be of scientific importance to the whole community, and their location should be recorded and as far as possible these sites should be avoided (MESA, 1997). The role of traditional and local knowledge has not been regularly incorporated in planning for sustainable development. In a study of data and ideas acquired by a human group about a region as a consequence of their occupation of the area for many generations Mailhot (1993), has suggested that traditional knowledge can be most usefully applied in development projects, renewable resource management and

impact studies. Western Mining Corporation has effectively applied the role of traditional knowledge among the Bla'an peoples of Tampak Island in Indonesia to assist in their development of mining operations in the region. It has also been considered for use by BHP Minerals Canada Limited in their development of a diamond project in the Northwest Territories (NRCan, 1995, p. 28).

**d. Integrated approach to land use development decisions**

An integrated resource management (IRM) approach to land-use decisions must take account of the interests of local communities, industry, labour, indigenous peoples groups and environmental groups. The approach provides a long-term view of development, the cumulative impacts of development and the competing social and environmental priorities in an area. In contrast to traditional land-use zoning, the IRM process recognises legitimate demands of a variety of resource interests and that no one resource should be developed to the exclusion of other resource opportunities; attempts are made to resolve potential conflicts at the planning stage through balanced and informed decisions (Box 14).

The concept introduces the element of flexibility for making decisions that reflect current needs without being locked into rigid long-term plans. Where indigenous peoples are affected, their early involvement will improve the longer-term viability of land-use decisions and ensure that all interests are protected. Effective IRM requires the early resolution of potential resource and environmental conflicts through shared decision making, close coordination and cooperation a good information base and the recognition of the legitimacy of other resource uses.

**Box 14: Integrated Landuse Management****Role Player/Stakeholder: Government, industry and the public**

Integrated Landuse Management provides a long-term view of development, the cumulative impacts of development and the competing social and environmental priorities in an area. In contrast to traditional land-use zoning, the IRM process recognises legitimate demands of a variety of resource interests and that no one resource should be developed to the exclusion of other resource opportunities; attempts are made to resolve potential conflicts at the planning stage through balanced and informed decisions.

In the past land-use planning processes have been undertaken in isolation from environmental assessments associated with the permitting required by mineral development. Proceeding with a mineral resource development without due regard to the regional context may lead to retroactive changes in the rules that in turn would negatively impact the investment climate. Linking project-specific assessment to regional land-use management integrates the cumulative aspects of human activity and provides a means of reaching an equitable ecosystem-based decision. One impediment to the process is the time and costs associated with accumulating regional baseline information and stakeholder consultations.

The economic, social and environmental consequences of land-use decisions have to be considered in order to arrive at an appropriate and acceptable allocation of the resources. Such considerations may require that some areas be protected from all kinds of development while in others multiple or sequential uses may be allowed. In South Africa the integration of policy, land-use management decision-making and permitting is in a state of transition. In South Africa the Department of Land Affairs has established a new directorate: Land Use Advisory Services with the purpose of optimizing the utilization of land for land reform. Functions of the directorate include *inter alia*, the development of mechanisms to promote effective land use management and planning (Country profile; South Africa, 1997).

**e. Taxation**

A country's tax system is an important determinant of industrial competitiveness and the investment climate. Government's responsibility lies in promoting industry competitiveness while ensuring that industry is motivated to meet society's environmental and social objectives. The main aspects of tax reform that could threaten exploration investment are the introduction of the capital gains tax and the increasing financial liability associated with mine reclamation (Box 15).

<b>Box 15: Environmental Taxes</b>
<b>Role Player/Stakeholder: Government, industry and the public</b>
❖ Government must consider the environmental, social and economic impacts of its tax policies and programmes as they pertain to minerals and metals in a manner that promotes both the competitiveness of the industry and sound environmental practices.

Source: NRCan (1995, p.55).

Attention is being paid to ways to make the tax system “green” by some of the leading agencies for sustainable development. The Institute for Sustainable Development has published a study on how to make budgets green (IISD, 1994). When trying to introduce a green objective to the tax system there are different interests at stake *“Environmentalists are concerned about environmental effectiveness, industry with the impact on competitiveness, production and profitability, and consumers’ organizations with impacts on the price of goods and services, especially on those who can least afford them.”* (Gale, 1994; p. 1). Future work will have to focus on how to take advantage of opportunities to restructure the tax system in order to achieve both economic and environmental objectives. In South Africa this may mean that the equity of tax treatments for the mining and recycling industry have to be reconsidered.

## **4. MANAGING MINERAL REVENUES**

### **a. Accounting for mineral resources**

For accounting purposes the characteristics of mineral resources (natural assets) are the most similar to the characteristics of assets included in traditional economic accounting systems. Although minerals should be considered as candidates for a treatment that is equivalent to that given other assets they have not enjoyed the equivalent status. Moving towards sustainable development requires that the status of mineral resources be immediately upgraded to that of other assets and that they be accorded the same accounting treatment in the national accounting systems. Failure to include mineral resources as a form of capital in national accounting systems has been blamed both for their over- or under-exploitation and for incomplete analysis and policy decisions in areas relating to productivity and budgeting (BEA, 2000).

Three points of inequality between the treatment of assets in the traditional economic accounts and the treatment given to natural assets have been noted by the United States Bureau for Economic Analysis (BEA, 2000). First, in traditional economic accounts, there is no entry for additions to the stock of natural resources equivalent to the entry for additions to the stock of structures and equipment. Second, there is no explicit entry for the contribution of natural resources to current production, as measured by gross domestic product (GDP), equivalent to the entries that capture the value added of structures and equipment. Thirdly, there is no entry for the consumption of the natural resource stock equivalent to the entry for the depreciation of structures and equipment used to arrive at net domestic product (NDP)—which is used by some as a shorthand measure of sustainable development.

Sustainable development in the minerals and metals industries requires that the lack of appropriate accounting for mineral resources in the traditional national economic accounts be addressed in several respects. First, proved and probable mineral reserves, like structures and equipment, yield a flow of services over many years. Proved reserves are entered, along with investments in new structures and equipment, in the firms 'balance sheets' and their value is attributed to share prices

that are the basis for trade by shareholders and investors. Second, even though there is no explicit entry for the contributions from resources like coal or oil in GDP, the value added is in a sense "appropriated" by the other factors of production and is included in the rents, royalties, and profits of the owners of invested capital. Finally, although the traditional economic accounts do not include an entry for depletion of natural resources, firms and investors recognize depletion in assessing the value of firms and the sustainability of their current profit levels (Box 16).

The treatment of natural resources in the mining industry has long been debated in economics literature (Adelman et al, 1991). The lack of good market prices for the value additions, depletion, and stocks has hindered the inclusion of minerals in the national accounts. Property rights issues, incomplete information, and the structure of payments for mineral rights mean that there are no complete or representative observable prices. Thus traditional economic accounts have treated the value added of mineral resources as free gifts of nature, making entries neither to the flow accounts for additions to, or depletion of, the stock of these resources nor to the wealth accounts (BEA, 2000, p.1).

**Box 16: Accounting for mineral resources; the treatment that allows an entry for depletion, but not for additions of mineral resources**

**Role Player/Stakeholder: Government, industry and the public**

- ❖ First, deduction of depletion will provide a measure of NDP that reflects the depletion of mineral resources in GDP. Although it is not explicitly identified, the contribution of mineral resources is already included in GDP. Deduction of an estimate of depletion will give a partial measure of sustainability, one that indicates the using up of the existing stock of mineral resources. Without an entry for additions through exploration and development and through improved recovery techniques, deduction of depletion alone may produce misleading signals regarding the sustainability of a nation's production and wealth.
- ❖ Second, estimates of the value of additions to the resource stocks are large, but uncertain. Volatility in resource prices, changes in mining technology, and uncertainty about the ultimate recoverability from existing reserves all affect the value of mineral reserve additions.
- ❖ Third, probably the most important reason for the lack of enthusiasm for including additions to reserves as capital formation in GDP is that additions to reserves are so different from additions to capital stock. This difference, in combination with the volatility of additions to reserves, would limit the usefulness of accounts for conventional macroeconomic analysis.

Source: (Bea, 2000).

The omission of explicit entries for mineral resources, the absence of an entry, or market price, for depletion may together with common property rights, mean that the accounts do not identify overexploitation. This possibility is particularly important because a large share of South Africa's mineral resources (about 25 per cent, Blignault et al, 2001), are on public lands. Studies of productivity rely on land, labour, and capital inputs to be reflected in the production function, but because measures of natural resource productivity have generally not been available they are omitted and their value is not fully appreciated. Finally, the absence of measures of



natural resource stocks and stock changes on government owned land has been cited as contributing to less-than-optimal public budgeting decisions (Box 17; Adelman et al., 1983).

**b. Natural resource accounting and the economic value of mineral resources**

The economic significance, current state and past patterns of use and exploitation of mineral resources in Southern Africa has been examined by Hassan, Blignault and G-M Lange (2001). Using a natural resources accounting approach they examined the condition and management of mineral resources in Botswana, Namibia and South Africa. The dependence of these economies on minerals is reflected in their contribution to economic output as a percentage of GDP, their contribution to export earnings and the percentage share of mineral capital in 'aggregate' capital stocks. While Botswana continues to be very highly dependant on mining, the importance of minerals to South Africa and Namibia has continued to decline since the early 1980's. The low proportion of mining's contribution to GDP indicates that South Africa and Namibia have diversified the composition of their total economic output into services and manufacturing and invested less in non-mining assets than Botswana. However the high dependence of these three economies on mineral exports is an indication of dependence on direct extraction and liquidation of the natural assets and is considered to be a sign of vulnerability to external shocks (Hassan, Blignault and Lange, 2001).

Behind the observed trends in economic behaviour are a number of drivers that are not adequately revealed by the current national statistics. Shifts in mineral prices and hence asset values, depletion of resources, the allocation and rate at which mineral rents are captured, the nature of the property right regimes and changing mineral policy environments would all affect the systems of national accounting. Furthermore the true contribution of mining to economic welfare can only be properly assessed if the social costs, negative externalities and health of ecosystems are accounted for.

**Box 17: Estimates of mineral resource value****Role Player/Stakeholder: Government, industry and the public**

- ❖ The value of additions has tended to exceed depletions.
- ❖ Changes in the stocks of these productive assets over time have largely reflected changes in their resource rents.
- ❖ Increases in resource rents have been accompanied by greater investment in exploration and enhanced recovery technology.
- ❖ Reduced exploration activity and the closing of marginal mines have accompanied decreases in rents for some resources.
- ❖ Proved mineral reserves constitute a significant share of the economy's stock of productive resources.
- ❖ The stocks of proved mineral resources are worth 2 to 4 times more than the stocks of invested structures and equipment associated with the resources.
- ❖ Valuing the effect of depletion and additions, as well as including the value of resource stocks, provides a significantly different picture of returns.
- ❖ Although the trends that emerge from the alternative methods are similar, the range of estimates is large. The highest estimates of stocks, depletion, and additions were obtained from the current rent estimates based on capital stock values, and the lowest were from the current rent estimates based on average rates of return to capital.

Source: BEA (2000).

**c. Natural resource and environmental accounting (NRA)**

*“Natural resource accounting attempts to correct the measures of economic well being and social well being for depletion of natural capital the social costs of environmental externalities and the values of non-traded goods and services of the environment that are currently missing from the national systems of accounts.” (p.3)*

(Hassan, Blignault and Lange, 2001).

Of particular importance is the adjustment required to measures of net income (net domestic product, NDA) in the current accounts and net saving (net capital formation) in the assets account for depletion of mineral resources. Natural resource accounting constructs physical and monetary stock and flow accounts to provide the information for the analysis and evaluation of depletion of resource assets.

### ***Physical resource accounts***

Physical resource accounts are resource asset and flow accounts.

- Flow accounts indicate the supply and use of the resource by source and use sectors and activities for each time period.
- Asset accounts monitor the state and changes of physical stocks of the resource over time

Asset accounts are structured as shown in Table 2:

**Table 2: Physical and monetary accounts for mineral resources**

<b>Physical Resource Accounts</b>	
Opening Stocks	<b>+</b>
Economic use (depletion)	<b>-</b>
Additions (redefinition of reserves as economic assets)	<b>+</b>
Other changes in volume (new discoveries, technology)	<b>-</b>
<b>Closing Stocks</b>	<b>=</b>

Source: Hassan, Blignault and Lange (2001, p. 3).

Opening and closing stocks of mineral assets are the proved category, while other classes of resources are included according to their probability of economic exploitation.

### ***Monetary accounts***

The monetary accounts are simply a definition of the values of the physical entries in the physical resource accounts. Market prices are used to value flows of costs and benefits, while the value of stocks are determined by an asset valuation method such as the resource rent or user cost. Monetary accounts attempt to derive an economic accounting price that reflects the scarcity value of the resource over time

#### **d. Depletion of natural capital, sustainable income and resource rents**

The capacity of a mineral deposit or group of mineral deposits to generate the same stream of income and employment for future generations is reduced as the mineral reserves are depleted. Hicks (1946) defined sustainable development as the level of income that can be sustained indefinitely without diminishing asset stocks. Sustainable development requires that future generations be compensated by the investment of part of the present stream of current mineral revenues in capital assets in such a way that they are capable of providing the same stream of benefits in the future. Weak sustainability therefore acknowledges that there is complete substitutability between various forms of capital, namely natural, human, man-made, financial, social and environmental, and that the transformation of one form to another is perfectly acceptable under the concept of weak sustainability. Sustainability is therefore achieved if the flow of revenues from the liquidation of natural assets is reinvested in other forms of natural capital that provide an equivalent stream of benefits into the future. Strong sustainability however recognises that human and natural capital are complementary and that Hicksian income can only be maintained if natural and human capital are kept intact.

Both concepts of sustainability imply that net receipts from the sale of non-renewable assets contain an element of capital consumption (user cost) that has to be set aside and reinvested to compensate for depletion of the asset. This so-called consumption allowance or user cost represents the depreciation in the stock of the exhaustible natural resource and must be deducted from the NNP to derive a more appropriate indicator of sustainable income and consumption (Hassan, Blignault and Lange, 2001, p. 4).

Resource rent is the price used to value resource stocks and determine the reduction in natural wealth so that the measures of economic performance can be adjusted to account for depreciation of natural assets and resource depletion. Resource rent is the most commonly used measure of natural resource stock value. The measure of non-renewable resource stock consumption (use) is the user cost.

### ***Results of analyses of physical mineral resource accounting***

The results of an analysis of the physical resource accounts by (Hassan, Blignault and Lange, 2001, p. 5) are presented in Table 3, below.

**Table 3: Physical resource accounts**

Country	Initial stocks	Rate of depletion	Life of reserves (yr)	Consumers
<b>South Africa</b>				
Gold	59 000 (1968)	700 t/a (40%)	76	
Coal	40bn t (1968)	150m t/a	122	Local (ESCOM 60% SASOL 29%) and exports
<b>Botswana</b>				
Diamonds		13-20 m carats/yr		
Coal		Very low	7000	Mainly local
Copper & nickel		49 000 t/a		
<b>Namibia</b>				
Diamonds	Onshore diamonds almost exhausted			
Gold	Recent addition to mineral production			
Uranium	Gradual depletion		10	Extraction rate varies

Source: Hassan, Blignault and Lange (2001, p. 5).

### ***Results of analyses of monetary mineral resource accounting***

The results of the analysis by Hassan, Blignault and Lange (2001) of the size of the total rent from minerals production and the share of rent collected by government through taxes are summarised in Table 4.

**Table 4: The size and variability of rents captured by governments**

<b>Country</b>	<b>Percentage captured by government</b>	<b>Variability of rents collected</b>
<b>South Africa</b>	Low, particularly for coal	
<b>Botswana</b>	Approximately 100%	Moderately variable
<b>Namibia</b>	Almost 100%	Highly variable

Source: Hassan, Blignault and Lange (2001, p. 5).

Botswana captured most of the mineral rents. The rate of capture of Namibian rents has been highly variable due to the variability of mineral prices and the diversity of minerals they produce. This made it difficult to implement a policy of full rent recovery in every year. In the case of South Africa the government has not been successful in capturing rents because of very low royalties and the major negative externalities associated with coal production. This suggests that coal has been extracted above the socially optimal levels, that the country has overproduced electric power and over-polluted the domestic environment. South Africa's declining rent receipts after the early 1980's is due to changed profit sharing regime after 1992 and the declining profitability of the gold mines. According to Hassan, Blignault and Lange (2001), variations in the regimes and policies governing property rights to minerals in the three countries are the main reasons behind the variations in the degree of minerals rents captured. However it should be noted that rent capture estimates have to be read carefully and critically to establish firstly, just how much rent was there for the state to capture and secondly, was it captured in the production/consumption process as a result of indirect taxes such as VAT or company taxes paid by later users.

The key point, and one which Hassan et al are heavily involved in, is that satellite accounts in line with the conventions established in the UN1993 system of national accounts, are being worked on in many sub-Saharan states. The data needed for policies directed at macro-sustainability is therefore available to policy makers.

### ***Appropriating and allocating minerals resource rents***

Property rights to mineral resources are the principle means of determining the distribution of rents accruing to government and private economic agencies. Public agencies allocate their rents to social development projects including public works infrastructure and basic services such as health and education; perhaps too large a portion goes to supporting current consumption activities. Private allocation of rents is typically towards private economic activities. Both types of investment result in new jobs and income opportunities, but the question of the size and relative efficiency of the investments is crucial to understanding the sustainability of minerals investments.

#### **e. Policies for managing mineral revenues**

The non-recurring, highly volatile and large size of mineral revenues highlights the need for prudent policies and robust mechanisms to invest and allocate windfall rents in projects sufficient to replace depleted ore assets. This concept lies at the heart of sustainable development and proposes that our offspring should be able to enjoy the benefits of mineral development in the same way that the current generation has. The experience of several countries has shown that the allocation of windfall rents is often subject to domestic political pressure the so-called 'political economy of rents' as Tilton (1992) has termed it and could be much more prudently managed. There is a tendency to use windfalls to boost consumption (by reducing taxation) rather than investing in production or social welfare (Radetzki, 1992). The increased revenue experienced by Bolivia from the oil price rises in 1973-1974 and 1979, for example, were used to lower taxes and had the effect of increasing foreign debt to the point at which foreign loans were halted in 1980 (Auty, 1993).

Still other countries (Venezuela and Saudi Arabia) have used resource revenues to develop economic infrastructure in an attempt to diversify the national economy and reduce dependence on natural resources. Although their short-term goals – such as employment generation in infrastructure development -- have been successfully met, the long-term success of such state-sponsored policies of diversification must be judged against the continued significance of natural resources exports from these countries. In contrast to Bolivia's consumption boom and the infrastructure

investments of Venezuela and Saudi Arabia, Chile has adopted policy approaches to deal with windfalls that illustrate a process of learning from the experience of other mineral economies. At the urging of the International Monetary Fund, Chile established a mineral stabilization fund in 1985 to secure mineral benefits while protecting the rest of the economy from either rapid injection or withdrawal of mineral revenues, and successfully used that fund to retire debt (Box 18; Auty, 1993; Poole et al., 1992).

**Box 18: Managing mineral revenues**

**Role Player/Stakeholder: Government, industry and the public**

- ❖ The high-volume, short-term and ephemeral revenues from minerals extraction are isolated and captured.
- ❖ These funds should be used to lower debts and taxes, improve social services and create short-term business opportunities outside of the mineral sector
- ❖ These benefits must be identifiable and closely linked to the revenues.
- ❖ The use of increased revenues to lower taxes may lead to increased foreign debt.
- ❖ Economic infrastructure can be developed to diversify the national economy and reduce dependence on natural resource revenues.
- ❖ Funds should be applied to projects to build local capacity, such as irrigation, recreation and health-care facilities or scholarship funds

***Mineral stabilization funds and trust funds***

Mineral stabilization funds segregate mineral revenues from other sources of government revenue and serve as an internal buffer to reduce the impact of revenue fluctuations in that volatile sector on public spending and exchange rates. The fund accumulates reserves in years when market prices exceed an anticipated reference price. In the case of Chile, the price differential between reference and market prices is split into three stages, requiring a progressively greater percentage of the differential be paid into the fund. Its success is linked to a sound mineral taxation



policy, structured so as to be able to extract windfall revenues without deterring long-term investment in the mineral sector. The copper fund accounted for one quarter of Chile's official reserves of \$2 billion in 1988, and by 1989 the fund had increased to \$1.7 billion (Auty, 1993).

Establishing permanent trust funds are a means whereby the high-volume, short-term and ephemeral revenues from minerals extraction are isolated and captured. Application of these funds to lowering debts and taxes, improving social services and creating short-term business opportunities outside of the mineral sector means that these benefits are identifiable and closely linked to the revenues (Box 21). Permanent trusts with principal derived from natural resource revenues have been adopted by federal and state governments in developing and developed economies, and typically receive between 1 and 30 per cent of revenues derived from mineral resource development. The state of Alberta in Canada, for example, has a development fund that invests resource revenues as loans to other provinces, as equity in development projects, or in projects to build local capacity, such as irrigation, recreation and health-care facilities or scholarship funds (Box 19; Pretes and Robinson, 1989).

**Box 19: Permanent trust funds compared to state-managed accounts**

**Role Player/Stakeholder: Government, industry and the public**

- ❖ The fund principal is protected from expenditure by the Government;
- ❖ The capital source is distinctly from mineral resources, i.e., does not derive from general fund transfers;
- ❖ The principal is held in trust for beneficiaries with the State acting as trustee;
- ❖ The fund is designated for a special purpose or serves some function other than general state expenditures
- ❖ It must be invested specifically in human and social capital, and;
- ❖ Income derived from fund investments may also have a special purpose

Source: Poole et al., (1992).

Capital in the trust fund increases through deposits and investment income, so that the original capital is preserved and earnings can be used to finance the state's budget or development initiatives. Thus the trust fund converts the non-recurring income from non-renewable resource extraction into a renewable resource, and fund earnings can replace the income stream from the natural resource once the resource is depleted (Poole et al., 1992). Numerous investigators including Mikesel (1989), Davis and Moore (2000) and Carins (2000) have provided the formulas and means by which the amounts directed to the funds should be established (Box 20).

Papua New Guinea, which has witnessed increased investment and production in copper and gold projects over the last decade, (Mining Journal, 1996a) has accumulated experience in the successful application of mineral stabilization funds. The country first used stabilization funds to mitigate the impact of revenue fluctuations on the economy from the world-class Panguna copper mine at Bougainville. In the early 1970s, revenues from the Bougainville copper mine were placed in the fund, and since copper prices and revenues fell during the mid 1970s the fund played a significant role in public spending. The country also used the fund to successfully offset the economic disruption when Bougainville suddenly closed in 1989 following its takeover by secessionist forces. Bougainville had provided one third of Papua New Guinea's gross national product, and the fund was used to cover for the sudden loss in revenue and provided a means for the Government to avoid sharp revenue fluctuations while negotiating external loans (UNESA, 1998). Deployment of income and principal from the fund was able to cover the period from the cessation of production at Bougainville in 1989 to 1992, when expansion at other mines (Ok Tedi and Misima) provided a flow of revenue (Auty, 1993).

**Box 20: Permanent trust funds compared to state-managed accounts****Role Player/Stakeholder: Government, industry and the public**

- ❖ Saving mineral resource revenues that would otherwise be consumed;
- ❖ Extending the benefits of resource revenues over several generations or in perpetuity;
- ❖ Providing an additional source of budgetary income;
- ❖ The principal is held in trust for beneficiaries with the State acting as trustee;
- ❖ Being used to intervene in the economy to achieve state objectives, such as diversification or stabilization
- ❖ Providing an additional or alternative source of investment capital, and;
- ❖ Neutralizing windfall effects and preventing distortions from arising in the economy.

Source: Poole et al., 1992.

***Institutional measures for isolating mineral revenues***

Mineral wealth can be separated from the political process and other public revenue streams through a number of institutional measures including satellite accounts (Box 21). These measures serve to prevent misappropriation of the funds by government and interest groups and also serve to dampen the destabilizing cyclical nature and impact of mineral booms. Constitutional protection was given to Alaska's non-renewable resources revenues in 1976 through establishment of the Permanent Fund (valued at over \$12Bn in 1998), which receives 25 per cent of the countries mineral revenues (Poole et al., 1992). Alaska now requires a state referendum to amend the constitution before the monies can be spent. The Chileans introduced another such measure by giving their Central Bank more autonomy, thereby reducing the political control over the money supply and foreign debt.

**Box 21: Mineral satellite accounts****Role Player/Stakeholder: Government, industry and the public**

- ❖ Satellite accounts supplement rather than replace existing accounts
- ❖ Satellite accounts retain consistency with existing accounts but use different concepts and definitions by design
- ❖ Satellite accounts are designed to expand the analytical capacity of the national accounts
- ❖ Satellite accounts maybe built around a broader concept of capital formation than the existing accounts
- ❖ Satellite accounts add detail about monetary and physical data

Source: BEA, 1994b.

***Leases and performance bonding***

The successful development of mineral deposits typically requires large amounts of capital, skill and expertise, and where Government is the owner of the mineral rights the process is often conducted through a lease agreement. The lease is a legal instrument that conveys the right to develop a deposit to another party, and binds the lessor and lessee into an agreement that determines how the benefits from the development are to be distributed. If used effectively, the lease can be a significant mechanism for creatively harnessing the economic and social benefits of mineral production and for building technical and managerial capacity and sustainability (UNESA, 1998, p. 11).

The lease is a right to the lessor that can be used to capture economic and social benefits from the mineral resource. Under most leases, the costs of exploration, development and production are borne by the lessee, while the level of benefits reserved for the lessor is negotiated between the parties. Analysis of the operation of mineral leases for oil and gas in the United States of America has illustrated that there are three central elements within the lease that allow the lessor to capture a

diverse range of economic and social benefits. According to Hemingway (1991) these are:

- Bonus payments; the sum paid to the owner of the mineral deposit by the developer over and above the actual price paid in order to acquire the lease. Proven deposits will command a higher bonus than unproven deposits;
- Payments for the right to delay: (delay rentals); the sum paid to the owner of the mineral deposit by the developer if the developer decides to delay the commencement of operations to compensate the owner for loss of royalties. Where no production is obtained, delay rentals can be the most valuable right to the owner of the mineral deposit, and;
- Royalties; a fractional part of the minerals paid to the owner of the mineral deposit as share of the profits from the mineral development. It can be considered the owner's share in the profits of a joint enterprise in which the owner puts up the land and the recipient of the lease puts up the capital and skill.

The issuance of a lease by the appropriate government department provides a means for the mineral owner to capture economic and social benefits from specific mineral projects through royalties or net smelter returns. In countries with experience of mineral leasing, such as the United States, Canada and Australia, there is a tendency for leases to be "front-loaded" with terms and conditions since the opportunity for intervention is more limited in the post-lease stages as indicated by Laitos (1991) in connection with environmental conditions attached to oil and gas leases.

Performance guarantees provide incentives for continued investment in local infrastructure and programmes to build social capacity over the life of the mine. Such performance guarantees are financially supported through the use of performance bonds, which can be structured either as a mine-specific bond or as a fund that can be used for wider social issues, many of which may only be indirectly related to mining. Several countries currently use bonding as a principal tool to ensure surface reclamation and restoration, and that mechanism could be adapted to cover social as well as environmental impacts. Like environmental bonds, social

performance bonds can strengthen the capacity of existing institutions to facilitate foreign and domestic firms in achieving and maintaining environmental and social best practice at mining operations, from exploration through development and production to closure (UNESA, 1998, p.12).

## **5. SOCIAL INFRASTRUCTURE**

Responsibly managed mineral development can make a valuable contribution to the environmental, social and economic well being of nations and local communities, particularly those communities in remote areas. Communities both during and after the life of the mine must be better advantaged because of the mineral investment. Recently the World Bank group has set out to explore the linkages that exist between mining and the four dimensions of poverty – economic opportunity, capability, security and empowerment in the context of small- and large-scale mining sustainable development acknowledges the need to work with all stakeholders to:

- Address issues related to land and resource use;
- Increase the participation in economic activity; and,
- To ensure that the benefits of natural resource development are equitably shared.

Because mineral development often takes place in areas inhabited by indigenous peoples they tend to have a strong interest in such activities, particularly in remote locations. Greater dialogue and collaboration between mining companies, workers and the affected communities is required. Consultative mechanisms to encourage community involvement in planning mining operations will help ensure that these activities are compatible with social and economic development of the local community, the preservation of local traditions, and the preservation of environmental and recreational values (Box 22).

Identifying the stakeholders is exceptionally important in regard to the relationship between companies undertaking mineral or mining development and local communities. In a study related to investment in the people in local communities, Warhurst (2000) has identified the key stakeholders, shown in Box 15, with whom consultation and dialogue will be indispensable.

**Box 22: Identifying the stakeholders and role players****All stakeholders and role players.**

- ❖ Communities whose aspirations have been changed by the indication of project development
- ❖ People displaced by the project
- ❖ Employees and labour unions affiliated with the project
- ❖ People affected by effluents associated with the project
- ❖ Local business suppliers
- ❖ Suppliers of goods and services
- ❖ Local authorities
- ❖ Relevant government representatives or Ministers
- ❖ Reporters that might cover meetings or developments at the project site
- ❖ NGO's or IGO's that have taken an interest in the project and it's impacts
- ❖ Socially responsible investors
- ❖ Representatives of local environmental groups

Source: Warhurst, 2000.

According to Warhurst (2000). The most successful community development programmes work in partnership with NGO's, IGO's, national governments, international donors, other businesses religious institutions, universities and other organizations interested in promoting community developments (Box 23). The experience of the Palabora Mining Company demonstrates how partnerships in education can add value to the corporate community development programmes. The Palabora Foundation together with the Department of Education and other role players started eight preschools in the communities surrounding the mine. The agreement was that the Department would supply the teachers and the schools would be run by steering committees that include staff of the foundation, officials of the Department of Education and members of parent and other community groups. The Foundation has since helped other communities set up preschools,

implemented programmes to improve maths and science, and helped public schools set up library services for students.

**Box 23: Benefits to the local communities**

**Role Player/Stakeholder: Government, industry and the public**

- ❖ Potential to significantly benefit the local population
- ❖ Creation of direct and indirect employment
- ❖ Skills transfer
- ❖ Enhancing the capacity of health and education services.
- ❖ Improved infrastructure
- ❖ Creation of small and medium business opportunities

The negative impacts of mineral development activity on the health and safety of employees and surrounding communities must be minimized. The advent of mining brings with it the inevitable closure of the operation that leads to significant adverse effects on the local population. Environmental impacts of the industry's activity as well as the social impact of mine closures must be addressed and mitigated (Box 24).

**Box 24: Adverse effects on the local communities**

**Role Player/Stakeholder: Government, industry and the public**

- ❖ Infringement of rights
- ❖ Traditional means of livelihood are affected
- ❖ Impact on land rights
- ❖ Infringement of indigenous peoples rights
- ❖ Induced inflation
- ❖ Influx of newcomers to the area
- ❖ Disruption of traditional social structures
- ❖ Social jealousy



**a. Workforce**

***Training and Education***

Education and training are essential components in the development of a country's capacity to increase economic and social benefits from mineral extraction and processing. As an investment in human capital, education and training can foster the development of the skills and capacities necessary to participate in the minerals sector. The image and profile of the mining industry is changing from one where the pick and shovel were the main tools to one where the industry's labour force is educated and high level technology and skills are applied. If it is to attract and retain qualified people it will need to ensure that training and education are continually upgraded. In particular workers should be given training and skills that will allow them to gain meaningful employment and to participate in the process of rapid technological change. Eight human resource challenges facing the Canadian mining industry have been identified through a study entitled *Breaking New Ground: Human Resources Challenges and Opportunities in the Canadian Mining Industry*, and carried out by Human Resources Development Canada in 1993. These eight issues are of significance in the South African mining industry context and refer to:

- Ongoing training and development
- Upgrading of basic academic skills
- Nation wide occupational standards
- Addressing workforce dislocation and adjustment
- Training in trades
- Workforce diversity
- Mining related post-secondary mining-related education
- Industry partnership with secondary schools

Training and education can improve the resiliency of local communities to fluctuations in mineral activity by emphasizing the development of skills that are transferable beyond the mineral sector. For example, the Jackpile-Paguate Mine, located on the Laguna Pueblo Native American Reservation in New Mexico, initiated a programme of cross-training to develop skills and expertise to be used locally once the mine closed. Mine workers were provided with training in construction, earthmoving and business activities, so that once production ceased Laguna Pueblo

had developed sufficient local capacity to go into business as a regional contractor. Laguna Construction is now one of the largest Native American enterprises of its kind, specializing in land reclamation, hazardous waste management and construction (MERN, 1996c).

The issue of retraining for workers that have been retrenched from South African mining operations has been addressed to some extent through the issuing of training vouchers that they can exchange for training at various institutions for up to two years after retrenchment (Graduate School of Business, 2000). The Mine Workers Development Agency (MDA) has also assisted retrenched miners make the transition to post-mining life through training programmes (Graduate School of Business, 2000).

Mining companies should initiate on site training programmes to ensure appropriate on-going reskilling for all employees at mining operations. This would mitigate the adjustments that retrenched mine workers are required to cope with by facilitating their smooth transition to the non-mining sector and assist in relocating them in productive employment (Box 25).

**Box 25: Workforce training – retraining and reskilling**

**Role Player/Stakeholder: Government, industry and the public**

- ❖ Workers should be assisted in the preparation for after mining employment
- ❖ Retrenchment packages are linked to retraining programmes
- ❖ Programmes are offered through the Mine Workers Development Agency (MDA) that offer skill to retrenched mine employees to set up micro-enterprises

***Worker health and safety***

Mining is a potentially hazardous occupation. Recent events concerning the mining-related diseases at some of South Africa's now-closed asbestos mines have highlighted the fact that high priority must be given to ensuring that workers at all

stages of the mineral exploration, development and production stages operate in a healthy and safe environment. Mineral fibres and their impact on health are under the spotlight. Health concerns relate to the prolonged exposure and the two biologically pertinent factors, dimension of the fibres and the dosages received by workers.

Worker health and safety in South Africa is regulated through the Occupational Safety and Health Act of 1993 and the Mine Health and Safety Act of 1998.

The mining industry is faced with concerns about worker safety and health in regard to the operating environment for workers, and the potential for rock failure, mine subsidence, exposure to air-borne as well as the stress associated with working shifts in what is a twenty-four hour a day business (Box 26). A collective bargaining framework, minimum employment standards and occupational health and safety requirements for all mines are regulated by government and overseen by the labour representatives through the National Union of Mineworkers.

**Box 26: Worker health and safety – eliminate all injuries and illness from the workplace**

**Role Player/Stakeholder: Government, industry and workers**

- ❖ Maintain a comprehensive occupational health and safety management system with standards and procedures in place and integrated into all aspects of the business
- ❖ Adopt a zero tolerance approach to unsafe acts and conditions
- ❖ Provide occupational health and safety training and development for employees
- ❖ Ensure that hazard identification and risk assessments are conducted for new processes and activities and for changes to existing processes and activities
- ❖ Ensure that contractors and suppliers comply with all occupational health and safety programme requirements
- ❖ Conduct regular occupational health and safety audits
- ❖ Seek continuing improvement through setting and reviewing targets, assessing and reporting occupational health and safety performance and ensuring best practise is applied
- ❖ Communicate with all stakeholders on a regular basis
- ❖ Build from a foundation of compliance with applicable laws, regulations and voluntary commitments
- ❖ Maintain an off-the-job safety programme
- ❖ Review this policy at regular intervals in consultation with the employee representative bodies

Source: Richards Bay Minerals, 2000.

**b. Community Stability**

***Integration with the local community***

Sustainable development requires equal and committed participation from government, the local community, industry and all interested and affected parties in

order that economic and social benefits from mineral projects and broader development objectives be realized. The integration of mining projects in developing economies into wider regional development programmes, supported by developmental aid agencies, multilateral financial institutions and/or NGO's ought to be done at an early stage of national planning and land use planning. This ensures that opportunities for building local capacity during the development and operation of a mineral project can be utilized. A number of mining companies active in developing economies have already demonstrated their support for partnerships, noting that in addition to their developmental benefits, partnerships provide added security of investment in the short-term and can facilitate the emergence of favourable conditions for investment over the longer term (Cooney, 1995).

According to Cooney (1996), Placer Dome has begun a partnership model of social investment at its Las Cristinas Project in Venezuela. The company has sought to strengthen its efforts within indigenous communities to promote the expansion and diversification of the non-traditional cash economy. It is anticipated that this process will increase autonomy and provide the resources to secure traditional activities and social institutions. Indigenous communities have, for example, secured carpentry and forest products supply contracts with the mining company. The company has also accepted and acknowledged small-scale artisanal mining on parts of the Las Cristinas property. Furthermore the company initiated a social investment programme during the final phase of exploration, which provided assistance to expand a local school, improve a local clinic and install a new water storage tank. That initial programme is to be supplemented with increased capacity-building activities that aim to strengthen community capabilities and institutions. Specifically, over the life of the mine, the programme aims to (Cooney, 1996):

- Improve the level and distribution of income within local communities;
- Facilitate the creation of a sustainable, diversified economy;
- Encourage local initiatives and the development of stable communities;
- Increase the level of education and training within communities;
- Improve the quality of life and access to essential public goods and services;
- Minimize environmental impacts;
- Increase the participation of women in development.

A key component to Placer Dome's partnership model of social investment is the establishment of dialogue, consultation and negotiation between different stakeholder groups affected by the mineral development. Increased public participation in decision-making at all stages of minerals development, from initial exploration through development and operation to closure and the establishment of post-mining land use, represents a significant contribution to the development of a country's capacity to maximize the benefits and minimize the costs of mineral production (MERN,1996b).

In the case of Las Cristinas, Placer Dome, entered into an agreement with the Canadian International Development Agency in 1996 to complete a viability study for a local economic diversification initiatives (social economic improvement) programme. The objective of that agreement was to create a strategic framework for promoting long-term social, economic and environmental sustainability of local communities through the activities of local non-governmental organizations and international non-governmental organizations and with the support of the company. Projects for consideration during the development of the strategic framework included investment in eco-tourism, upgrading of aviculture facilities, technical assistance for small-scale mining, sewing workshops, cement block fabrication, and the development of local organization and leadership capacity, education and training, and micro-enterprise financing (UNESA, 1998, p.15).

### ***Post-mine closure adjustments***

Physical depletion, falls in commodity and metal prices, the unpredictability and cyclical nature of mineral and metals markets, temporary mine closures or any reason for falls in employment levels leads to social and economic hardship for retrenched workers and families in mining –dependent communities. One of the several reasons that the Gold Crisis Committee was established in 1998 was to address the issues of adjustment, coping with new lifestyles and the transition to the non-mining sector that retrenched workers have to face when a mine closes or downsizes. Such impacts could be mitigated by careful integration of mine closures

with new mine developments, community consultation and by increasing the mobility of the workforce.

Greater uniformity in educational standards, development of skills and occupational standards across the mining professions would allow greater opportunity for relocation both in and outside the industry. In all mining operations the awareness of eventual mine closure has to be acknowledged and timeous notice of mine closure will ensure the preparedness of the workforce and community to accept and adjust to the event.

Richards Bay Minerals initiated a micro-enterprise development program involving training for entrepreneurs and small businesses. Through its Business Advice Centre, Richards Bay minerals offers training for small businesses, programs to promote purchasing from small businesses by the company, a programme to link small businesses with larger partners. They also established the Local Business Service Centre in conjunction with the Department of Trade and Industry, a bank to grant small easily accessible loans to vendors and hawkers. In conjunction with the Department of Education they have made the effort to introduce entrepreneurship training as an accredited subject in national school curricula (Richards Bay Minerals. A Sense of Commitment, Video, 1995. An RLA production).

### ***New mine development***

Economic development at the site of the mining operation may not be an appropriate or feasible policy approach for capturing social or economic benefits at all mineral operations. Alternate approaches to the establishment of the extensive economic and social infrastructure often associated with mining operations have been introduced. In such cases mineral resource rents are captured through fiscal means and are allocated for economic and social development projects in the wider regional economy.

One approach is to reduce traditional backward and forward linkages to the local economy to a minimum by not promoting economic growth and its attendant service and administrative infrastructure at the site of production. This may be particularly

appropriate for frontier areas with low population densities, where a workforce can be more cost-effectively recruited from distant locations on a fly-in basis rather than being sustained on-site. This is unlikely to be an appropriate policy in Africa where the technology is likely to be more labour intensive, and where one would want to encourage the use of a labour rather than a capital intensive approach.

The adjustment and dislocation that workers and communities have to cope with as a result of mine closure is also mitigated to some extent by the fly-in-fly-out approach to mineral project development used in Canada and Australia. With these problems in mind land-use designations that could permanently close local mineral resources to future exploration and development should be avoided (Box 27).

**Box 27: New mine development**

**Role Player/Stakeholder: Government, industry and the public**

❖ “It is crucial for resources companies to develop strong, positive and transparent relationships with local indigenous communities early in the project in order to provide the local communities with sufficient knowledge to assess the options and make informed decisions. A thorough knowledge and understanding of the community should be accompanied by assistance to the community to gain a matching level of understanding of the company. Only then can a long term, honest and open relationship be developed between all parties which will bring peace and order to communities, whilst increasing security of title, and reducing risk to the project, which will be to the advantage of all interest groups.”

Source: Davis, 1998.

**c. Indigenous peoples participation**

The positive benefits that the Royal Bafokeng tribe have enjoyed as a result of their ownership of mineral rights to platinum in the in the Rustenburg area have highlighted the benefits that indigenous peoples groups can harvest from mineral developments. Royalties from mining operations, improved infrastructure, training, amenities, direct employment and other business opportunities are direct benefits of



local economic development. Indigenous people see their physical environment as more than an exploitable resource, for them it is a way of life and they retain a strong attachment to the land, their traditional economy and their lifestyles (Box 28).

Without some form of title there is little that local communities can do to influence mining industry's activities or for them to share in the benefits of mineral development. Many mining houses are however recognising the benefits of greater participation of indigenous peoples groups in the mineral development at an early stage and have formalized participation or business agreements with them. As with mining-dependent communities better communications between industry and indigenous people ensures a more sustainable and more equitable distribution of benefits.

#### **d. Indigenous rights and revenue sharing**

The allocation of rights to revenues, employment and other benefits from mineral investment can be a key consideration in promoting the development of local capacity (see, for example, the case study of recent initiatives in South Africa contained in the present report). Mineral rights in many countries are typically held by the national Government, with rights to extract the mineral transferred from the Government to a private company through a lease or concession agreement. In order to develop local capacity, revenue-sharing agreements between national, local and regional governments could be designed. These would facilitate the return of a significant proportion of the mineral revenue stream to sub-national (local and regional/provincial) jurisdictions and communities. The Philippines, for example, has a national wealth revenue sharing programme, in which 40 per cent of revenues are returned to the mining region by the central Government. Peru has a similar programme, in which one fifth of the income taxes from mining activities are distributed to regional governments (20 per cent) and local governments (80 per cent) (UNESA, 1998, p. 20).

The traditional model of mineral revenue distribution, in which the central Government receives revenues from mines via taxes and then distributes benefits to the population in the vicinity of the mine, does not work effectively in many

developing and transition economies. This is due to the limited institutional capacity of developing countries to administer such an arrangement. An innovative tax policy that either channels taxes to local communities or allows companies to make social expenditures in lieu of taxes could be considered. Such policies could be tailored to the needs of the communities directly impacted by mining development. Policies that provide tax relief for companies making social expenditures could provide a creative response to the particular challenges of mineral developments in frontier areas, where foreign companies may play the role of surrogate government, providing goods and services to communities for which the Government has the responsibility but not the capacity to deliver (Cooney, 1996).

In a complementary study to this by Kangwa (2001), privatisation of Zambian state owned copper-mining enterprises was the focus of research. He found that privatisation led to the establishment of the National Social Safety Net (NSSN) in 1993. Following a needs-assessment of employees in state owned enterprises by the NSSN, most employees opted for retraining in skills linked to agriculture, small business enterprises and local business development [Chief Programme Officer, NSSN, 2000]. This enhanced economic activity resulted in job creation for the local people. Privatisation attracted capital investment and technological innovation that created jobs and business for local companies. For example Chambishi Metals Plc (of South Africa) constructed a new plant at a cost of US\$130 million to treat the cobalt and copper rich slag and Metorex created about 300 new jobs by opening the Chibuluma South Mine after investing US\$11.5 million in the operations. Some mining companies are providing in-house-training and human resource development while others have sponsored the establishment of Training Institutions by ex-employees.

**Box 28: Developing and maintaining sound relations with employees and neighbouring communities**

**Stakeholders and role players: Industry and local communities**

- ❖ Facilitate the development of local communities moving them towards self-sufficiency and independence
- ❖ Develop and maintain cultural and socio-economic database of the communities within which the company operates
- ❖ Establish on going consultation process that promotes consensus in the community towards a common vision and actions aimed at continuous improvement
- ❖ Evaluate the effectiveness of current programmes and initiate appropriate new programmes aimed at sustainable development
- ❖ Develop the necessary skills of accountable employees to deal effectively with community relations
- ❖ Communities policy to be integrated into long term objectives, corporate plans and mine closures
- ❖ Establish quantifiable and appropriate reporting of environment and community relations performance
- ❖ Link Communities policy with environmental policy and occupational health and safety policy
- ❖ Strive towards best practice at all times through information exchange with other companies and authoritative sources

Source: Richards Bay Minerals, 2000.

## **6. INTERNATIONAL LEADERSHIP**

As a trading nation and major role player in international minerals and metals industry South Africa has a vested interest in international activities in the industry. Many of the issues in regard to the environment are finding expression through internationally recognised minerals industry-related organisations. The

positive correlation between a country's per capita income and the quality of its environment has been used to suggest that economic development and trade contribute to environmental protection. The reasons are based on the technical and financial ability of the richer countries to cope with environmental and social issues such as population growth and poverty. The IISD (1994, p.15), have summarised the issue in a report as follows:

*“ Sustainable development cannot be achieved worldwide while massive poverty persists. Poverty alleviation is a central objective of development, and a key concern for environmental policies. Wealth created by trade is an essential means of achieving this end.*

*...Barriers to trade can create impediments to the achievement of sustainable development, particularly for developing countries, and trade liberalization is an important component of progress towards sustainable development for all countries.”*

The linkages between trade, development and the environment underlie the importance of instituting an integrated approach to trade, environmental and social and economic development. As a result sustainable development must become one of the guiding principles of South Africa's foreign policy.

#### **a. Diversification**

Diversification theoretically provides an ideal economic strategy for reducing the exposure of mineral economies to the destabilizing effects of cyclical swings in mineral prices. The objective is to increase the capacity of the mineral economy to ride out price fluctuations by dispersing economic activity across several different sectors and avoiding concentration in a single, highly volatile sector. Policies of economic diversification can either be vertical (promoting downstream parts of the core business to capture value-added activities, such as processing and fabrication) or lateral (promoting activities that are more autonomous from those of the core sector). Although governments and particularly those of developing countries have widely adopted, policies of economic diversification have often met with only limited success.

An innovative and successful partnership to maximize social benefits can be seen in the development by Cominco of the Red Dog Mine on territory owned by the Northwest Alaska Native Association (NANA) in Alaska, United States. The world class Red Dog zinc deposit, which began producing high-grade zinc, lead and silver in 1989, is considered a model of progressive northern development, and provides an insight into how the development of large mineral projects in transition and developing economies might be harnessed to build local capacity. The NANA/Cominco development agreement sought to extend conventional efforts at economic diversification through a comprehensive programme to develop local capacity and provide a sustainable economic base for the region. Specifically, the agreement gives Cominco the right to build and operate the mine and market the metals. In return, NANA receives an escalating percentage of royalties that will eventually reach 50 per cent of mineral profits. The agreement also provides local people with employment flexibility, allowing indigenous people to pursue a traditional lifestyle while providing modern training and employment. A subsistence advisory committee establishes strict protections to ensure that the mining development does not interfere with subsistence activities such as hunting and fishing, while a stakeholder-hire programme establishes hiring preferences for indigenous NANA stakeholders to work at operations. A joint NANA/Cominco management committee has been established to review and approve operations activities, an employment committee has been set up to assist in hiring, training and promoting NANA shareholders, and NANA and its subsidiaries provide drilling, catering and other contracted services to the project (UNESA, 1998, p. 13.).

#### **b. International Cooperation**

New international activities and agencies have been established to facilitate the integration of environmental, social and economic development on a global scale (Box 29). It is of importance to South Africa that her international commitments are consistent with sustainable development goals and are implementable at the domestic level. Thus it is necessary to consult all legitimate stakeholders in the development of international agreements on the environment.

Because of the size, importance and reputation of the minerals industry in South Africa this country provides a major international source of advice and expertise. In future it is likely that South Africa will also have to provide advice and expertise in the implementation of sustainable development in the area of minerals and metals in adjoining countries and in the SADC region.

**Box 29: International cooperation**

**Role Player/Stakeholder: Government, industry and the public**

- ❖ The government should take responsibility for establishing international for a so that occupational health and safety issues in the mining industry are dealt with in a science based manner that will support sustainable development

Source: NRCan, 1995, p.61.

**c. Trade Liberalization**

Countries are implementing policies to dismantle trade barriers that impede economic growth. However the progress being made in the reduction of tariffs, import quotas, and other barriers is in some cases being offset by the imposition of economic protection in the guise of environmental protection through the imposition of sanctions and restrictions. It is essential therefore that rules and standards be set as appropriate to guide sustainable development.

Government should be committed to promoting transparent and open world trade with a readiness to address international and trans-boundary environmental problems with the international community. The goal should be to ensure that trade policies do not contribute to environmental degradation and that environmental policies do not unnecessarily restrict trading opportunities (Box 30).

**Box 30: Trade liberalization****Role Player/Stakeholder: Government, industry and the public**

- ❖ Government should work towards improved market access for South African mineral products and a rules-based multilateral trade system and the elimination of non-tariff trade barriers.

Source: NRCan, 1995, p.62.

**d. Export Promotion**

The changes taking place as a result of social, economic and political advances in countries in Eastern Europe, Southeast Asia and Latin America have manifested in new demand and offer new opportunities for minerals trade (Box 31). The appearance of new suppliers of mineral products means that international competitiveness can be maintained through market and product diversification. However this is not really an option for most SADC mineral producers. Export of mining related equipment and services is also providing South Africa with new opportunities for trade.

**Box 31: Export promotion****Role Player/Stakeholder: Government, industry and the public**

- ❖ Together government and industry should promote the new and expanded markets for South African mineral products, technology and equipment including environmental services and technologies and value-added products.

Source: Adapted from NRCan, 1995, p.63.

### **PART III      CONCLUSIONS**

The stakeholders in the minerals, metals and mining industry must make sustainable development their business. There has to be a sense of ownership and participation in the process of moving towards sustainable development and the recognition that this paradigm should be allowed to permeate every area of the way in which things – all things - are done in future. The biggest problem is that old ways of doing business die hard and new ways of introducing and making sustainable development indigenous to every aspect of the minerals and mining sector will have to be found. Mining companies are recognising that sustainable development is a concept that has to be unpacked along the way. There is no single point of arrival.

In the search for information during this study it emerged that there exists a gap of varying size between various stakeholders in regard to their appreciation of the way in which sustainable development is to be interpreted and implemented. Government on the one hand is characterised by enclaves where the principles and implementation of sustainable development are being “taken by violence”. It would be unfair to try and rank the various departments in terms of their acceptance and application of the principles of sustainable development, but clearly the Department of the Environment and Tourism appears to be well ahead of most other constituencies. It may be an incorrect perception and it may be that the Minerals Development Draft Bill has so occupied the Department of Minerals and Energy that they have not had time to respond to the issues of sustainable development, but there has not been forward thrust in their appreciation or application of the concept and its interpretation, that might have been expected.

The industry seems to be characterised by much the same problem. There are enclaves where the concept is being unpacked, interpreted, assimilated and applied in every area of their operations. These organisations, notably the larger, financially stronger and more conspicuous companies, are well ahead in the move towards sustainable development and could be termed “at the cutting edge’, by the way the concepts have been applied and assimilated by the company subculture; Anglo American and Billiton are the best examples.



In regard to the appreciation of the concepts of sustainable development there exists therefore a significant gap between government, industry and the broad spectrum of stakeholders and role players. Human, financial and time resources have to be sourced in order to bring these participants in the minerals and mining sector to a closer understanding and appreciation of their individual and corporate roles in the move of our society towards sustainable development.

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