MMSD
SOUTHERN AFRICA

Mining, Minerals and Sustainable Development in southern Africa

Volume 1
The Report of the Regional MMSD Process

The Report of the Regional MMSD Process consists of three volumes:
Volume 1: The Report of the Regional MMSD Process
Volume 2: The Executive summary of The Report of the Regional MMSD Process
Volume 3: CD The Report of the Regional MMSD Process

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We, the Steering Committee of MMSD southern Africa, tasked with overseeing the regional project, have reviewed the regional report. We believe that it provides a balanced record of the MMSD southern Africa process and fairly reflects the outcomes of the research completed and the wide range of stakeholder inputs received. We commend the report to all stakeholders in the mining and minerals sector as a guide to their contribution to sustainable development in southern Africa.

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Origins

From the 1970's the forces influencing industry to review its contribution to sustainable development have increased in magnitude. A heightened awareness of the need to include the principles of sustainable development in company policy led to global co-operation amongst mining companies, and the formation of the Global Mining Initiative (GMI).

The GMI channelled funding through the World Business Council for Sustainable Development (WBCSD) for an initiative that will provide the mining and minerals sector with guidelines as to how mining and minerals can best contribute to the global transition to sustainable development. This initiative is the Mining, Minerals and Sustainable Development (MMSD) project.

The WBCSD appointed the International Institute for Environment and Development (IIED) to undertake this project. The IIED was approached for several reasons: it had recently completed a widely accepted report on the global pulp and paper industry, it has no mining links and it will not be involved in the sector after the completion of the project.

The IIED established the MMSD Working Group to carry out the mandate of the WBCSD.

1.1 The MMSD project

MMSD is an independent process of multi-stakeholder engagement and participatory analysis that seeks to address every aspect of the interface between the mining and minerals sector and the concept of sustainable development. The aim of MMSD is to "identify how the mining and minerals sector can best contribute to the global transition to sustainable development".In addition to the nearly 30 major mining companies funding the project through the WBCSD, MMSD has received funds and in-kind support from non-commercial sources, including foundations, international organisations, regional banks and agencies, governments, NGOs and research institutes.

MMSD is a two-year project that began in April 2000. The project should result in the establishment of structures capable of being carried forward after its completion.

MMSD is involved in regional processes in the world's major mineral producing and consuming regions. These include southern Africa, Latin America, Australia and North America. Scoping studies are being conducted in Southeast Asia, the former Soviet Union and Europe. These regional MMSD processes are crucial components of the project. Each region is engaged in scoping issues and identifying institutional frameworks that could be established to promote sustainable development within the sector. MMSD aims to promote regional governance and build ongoing networks of stakeholders that will last beyond the lifetime of the project.

The MMSD process is:

- independent - listening to, and guided by all stakeholders, but under the control of none,
- consultative - stakeholders are consulted on each step of the process, and due recognition is given to their views,
- transparent - all publications, contracts and terms of reference are accessible to the public, and,
- regional - each regional centre has its own consultative process, governance structure relevant to the region, and is autonomous, transparent and accountable.

1.1.1 Objectives of MMSD

By March 2002, MMSD will issue a series of reports with recommendations as to how the mining and minerals sector can best contribute to the global transition to sustainable development. These recommendations will be based on:

- analysis of the issues,
- investigation of new standards and benchmarks,
- processes for continuing work beyond the scope of the current project,
- investigation of new working methods and relationships, and
- facilitation of greater trust and understanding between participants.

1.2 MMSD SOUTHERN AFRICA

The Steering Committee of MMSD SOUTHERN AFRICA, representative of key stakeholder groups from across the region, was elected at the MMSD Multistakeholder Meeting held in Johannesburg in November 2000. The role of this committee is to:

- provide general advice and support to the Working Group,
- peer review the outputs of the Working Group, and assure the quality of such outputs, and
- engage with stakeholders in their constituencies.

The Steering Committee advised and guided IIED in the selection and appointment of the MMSD SOUTHERN AFRICA Working Group.

The University of the Witwatersrand (Wits) and the Council for Scientific and Industrial Research (CSIR) jointly formed MMSD SOUTHERN AFRICA to lead, manage and guide the southern African MMSD regional process.

The objective of MMSD SOUTHERN AFRICA is to determine how the mining and minerals sector can best contribute to the region's transition to sustainable development.

1.2.1 Approach

In order to achieve the objective outlined above, MMSD SOUTHERN AFRICA designed a process comprising three phases.

1. **Scoping:** the purpose of this phase was to develop a common vision for transition to sustainable development in the mining and minerals sector in southern Africa, and to identify key areas for research.
2. **Situation analysis:** this is where the bulk of the work occurred through a series of contract research projects based on readily available information.
3. **Framework Development:** this final phase of the project entailed the development of a framework of recommendations that will guide the transition to sustainable development in the mining and minerals sector in the region. This phase also included commitment to the process by key stakeholders in the region.

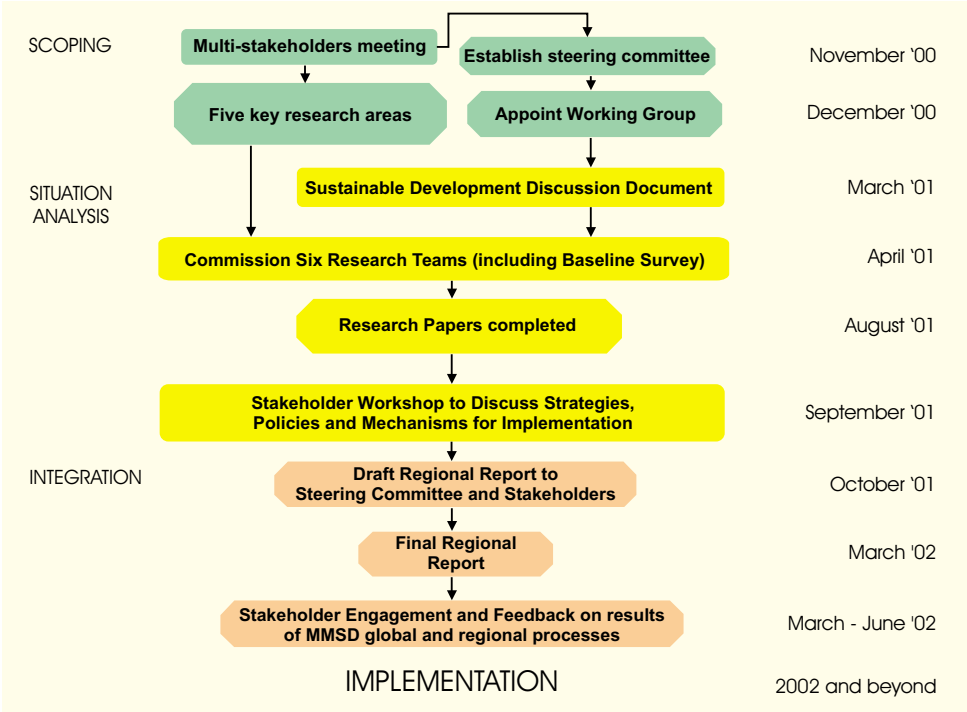


Figure 1.1: *The MMSD southern Africa process, indicating the strong stakeholder involvement.*

1.2.2 The research and consultation process

The MMSD SOUTHERN AFRICA project comprises two components: research and stakeholder consultation. These components are interactive and complementary - the regional issues to be researched were identified by the stakeholders and the reports, in turn, reflect the priorities of the stakeholders. Recommendations for implementation have been developed in collaboration with stakeholders.

In November 2000, at a Multistakeholder Meeting in Johannesburg, stakeholders identified the five key areas for research described below. The terms of reference were based on the results of that meeting. These were further refined in consultation with the Steering Committee.
The five research topics are:

1. Small Scale Mining and sustainable development in southern Africa (RT1),
2. HIV/AIDS, the mining and minerals sector and sustainable development in southern Africa (RT2.),
3. Social issues within the mining and minerals sector in southern Africa (RT3),
4. Mining, minerals, the biophysical environment and the transition to sustainable development in southern Africa (RT4), and
5. Mining, minerals, economic development and the transition to sustainable development in southern Africa (RT5).

A sixth research report (RT6) - a baseline study of the industry - was commissioned and funded directly by the global MMSD project.

In April 2001 six research co-ordinators were contracted to carry out the studies, and the Working Group contracted six independent reviewers, eminent in their relevant fields of study, to review the research reports.

Stakeholder engagement and consultation informs all the activities of the MMSD SOUTHERN AFRICA initiative. The Working Group accepted a set of principles according to which the stakeholder engagement component was conducted. These were:

- transparency,
- accessibility,
- neutrality, and
- consultation.

Southern Africa is a vast region, and to engage satisfactorily with stakeholders in a short space of time was not possible. Many stakeholders do not have access to the internet, telephone connections are unreliable and the postal services are slow. Further factors complicating stakeholder consultation are the multi-lingual nature of the region, the difficulties in identifying key players and the unsettled conditions in countries like Angola and the Democratic Republic of Congo (DRC). In spite of these drawbacks, MMSD SOUTHERN AFRICA now has over one thousand names of individuals and organisations on its mailing list. A continuous flow of information has been one of the success factors of the stakeholder engagement process.

A second multistakeholder meeting was held in Johannesburg on 18/19 September 2001. Stakeholder participation at this meeting is reflected in Figure 1.2.
The purpose of this meeting was to:

- update stakeholders on progress to date,
- share the results of the six research reports with stakeholders,
- agree on key recommendations, and
- identify possible mechanisms for implementation of the findings.

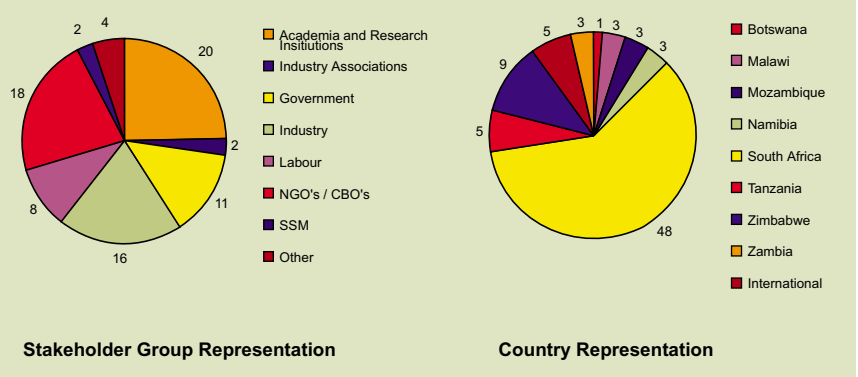


Figure 1.2: *Participants at the multi-stakeholder workshop held in Johannesburg on 18/19 September 2001.*

In addition to the above, focus group meetings were held in Mozambique, Namibia, Tanzania, Zambia, Zimbabwe and Botswana. MMSD SOUTHERN AFRICA also made a presentation to, and conducted discussions with, the Technical Committee of the SADC Mining Co-ordinating Unit in Luanda, Angola. At these meetings, the purpose and progress of MMSD were discussed, and stakeholders were able to identify initiatives and issues that were relevant to their countries. The issues raised at these meetings correlated closely with the issues identified in the research reports. Stakeholders suggested the formation of national MMSD chapters as part of the implementation process.

This chapter has traced the origins and development of the MMSD initiative. The following chapter outlines the significance of the mining and minerals sector in southern Africa, and Chapter 3 describes the context within which it operates. Chapter 4 deals with the challenges facing sustainable development in the region, and offers recommendations to meet such challenges. The report concludes with suggestions for possible structures to implement the recommendations contained in Chapter 4.

2. THE DEVELOPMENT OF MINING AND MINERALS PROCESSING IN SOUTHERN AFRICA

Noel Garson, Professor Emeritus, Department of History, University of the Witwatersrand, was commissioned by the Working Group to provide expert input for Sections 2.2 - 2.2.4.

2.1 Introduction

This section describes the history of the mining and minerals sector and its contribution to the economies of southern Africa. It is based on the six research reports compiled in the southern African regional analysis for the MMSD project.

'Southern Africa' refers to that group of states extending from South Africa north to the DRC. The term encompasses Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Tanzania, Zambia and Zimbabwe. Mauritius and Seychelles were not included because little or no mining takes place in these island states. Collectively these countries constitute the Southern African Development Community (SADC).

Figure 2.1: *The southern African region as defined for the MMSD project*

2.2 A brief history of mining in the SADC region

The exploitation of mineral resources has accelerated during the past century with the discovery of new ore bodies and the development of new mining and metallurgical technologies. These mineral resources hold the promise of exceptional long-term social and economic benefits for the region (Hounsome & Ashton, 2001). Such potential benefits are recognised as a key component of the recently launched and widely supported New Partnership for Africa's Development (NEPAD).

The large-scale exploitation of minerals and the growth of the mining and minerals sector has resulted in the establishment of a manufacturing base, a modern transport and communications infrastructure and the foundation for future growth in the region. However, developments in the mining and minerals sector in the modern era have not benefited all. Historically neither the profits nor the costs of the production of the minerals of the region have been distributed equitably among all the people involved in or affected by their production. The mining and minerals sector is closely linked with the long history of instability and conflict that characterises class and race relations in southern Africa.

2.2.1 Ancient mineral users in southern Africa

The earliest human beings in eastern and southern Africa, the makers of the first weapons and tools, possibly had some knowledge of minerals. In the case of the Bushmen, whose culture was of the Late Stone Age, the indications are stronger: the Bushmen were almost certainly acquainted with iron oxides, manganese dioxide and calcium and magnesium compounds, and used some of these for cosmetics and in pigments for rock art.

Actual mining, involving the extraction of ore from rock and the smelting of metal from the ore, along with the related development of the working of metal in some type of forge, began in southern Africa in the Early Iron Age. The mining of copper is believed to have started in Zimbabwe as early as 200 AD. In Zambia there is evidence of this activity in about 350 AD (Holmes, 2001, in RT6 Granville). Gold was used for ornamentation from a very early period, notably by the Egyptian pharaohs (Kirkemo *et al.*, 1997, in RT6 Granville).

Gold mining by the indigenous people of Africa, as distinct from trading in gold along the east coast, was carried on from as early as 500 A.D in the Early Iron Age until some point in the early 19th century. In the first millennium AD gold was principally obtained from alluvial beds, but also by open-pit mining and from quartz outcrops. The earliest known instance of gold smelting in southern Africa is the Thulamela settlement in the Kruger National Park, extant from the late 14th to the 17th century. Specularite has been mined in Swaziland for 28,000 years (Saunders, 1994, in RT6 Granville).

Most of the pre-colonial mining practised in South Africa dates from the Late Iron Age. The activity was largely confined to the interior plateau, in particular to the mineral-rich area known as the Bushveld Complex, which extends northward from the northern Free State to the Limpopo river and eastward from Zeerust in the North West Province, through the Northern Province, to Lydenburg in Mpumalanga. Extensive archaeological evidence suggests that mining activities in this area were carried out by Sotho speaking people.

Hundreds of ancient mine workings remain in the Northern Province of South Africa. Malachite was the preferred copper ore because it is easy to smelt. Messina and Phalaborwa in the Northern Province were sites for early copper mining. At Rooiberg, to the north of Pretoria, tin was mined and smelted to add to copper for the production of bronze as an alloy. By digging shafts and drives with iron picks and short iron chisels, veins of copper ore were followed for hundreds of metres at depths of around 15 metres (Saunders, 1994 in RT6 Granville). Where the ore occurred in hard rock, heating with fire and quenching with water split this.

Smelting took place close to ore deposits at favourable sites, i.e. those that had clay for constructing furnaces and abundant water and fuel. Pre-colonial iron smelting continued in southern Africa until the 19th century, and the British army in Natal found that the product of this primitive smelting process was superior to the iron imported from Britain.

2.2.2 European interest in the minerals of southern Africa

Large-scale exploitation of minerals began with European exploration in southern Africa. By 1530 the Portuguese had established themselves on the coasts of Angola and Mozambique and moved inland into the Zambezi valley to control trade, including that in precious minerals.

Modern mining in southern Africa is considered to have started after 1852, when systematic attempts were made to recover copper from outcrops around O'Kiep in Namaqualand, South Africa. The first exploitation of coal on a substantial scale was near Molteno in the Eastern Cape in 1870 (de Jager, 1976 in RT6 Granville).

2.2.3 Diamonds, gold and the demand for mine labour

In the last quarter of the nineteenth century southern Africa experienced a mineral revolution. The large-scale mining of high value commodities, first diamonds and then gold, launched the region into industrialisation and paved the way for the emergence of a modern capitalist economy.

The Diamond rush (courtesy of D. Minnitt)

The first alluvial diamonds of the colonial era were discovered near Hopetown in the northern Cape Colony in 1867. The discovery of richer deposits at a deeper level assured the establishment of the diamond-mining industry. The mining operations generated a need for capital and a demand for skilled and unskilled labour. Companies replaced individually worked claims; then followed a phase of company amalgamations. Finally, with the incorporation of the De Beers Company, a virtual monopoly emerged over both the production and marketing of diamonds.

Diamonds formed 20 per cent of the Union of South Africa's total exports in the years 1910 - 14. Immigrants, mainly from Britain, provided the skilled labour. Unskilled labourers were largely migrant workers, many of them, such as the Pedi of Sekhukhuneland, from territory still under independent rule. The distinction between skilled and unskilled workers soon assumed a racial form, giving rise to a de facto industrial colour bar. Partly for security reasons, the practice of housing the workers in closed compounds was adopted. All these features - the colour bar, migratory labour and the compound system - reappeared later, though in somewhat altered form, in the gold mining industry of the Witwatersrand.

The first notable discoveries of gold by Europeans in southern Africa took place within the borders of the old Transvaal (the Zuid-Afrikaansche Republiek) in the early 1880's. The most promising finds were in the eastern Transvaal, particularly at what became the Sheba Mine at Barberton. Gold deposits were also found in Bechuanaland (Botswana), and Swaziland. The major development was the discovery, in 1886, of the gold-bearing reefs of the Witwatersrand. In 1893 the gold-bearing reefs were found to dip towards the south. Mining would now require a preceding development phase, mainly in the form of shaft-sinking. The proving of the deep levels ensured that the gold mining industry of the Witwatersrand would develop on a virtually permanent basis and with far-reaching results. For many years the growth of the industry remained concentrated on the Witwatersrand, until the opening up, in the 1940s, of new goldfields on the Far West Rand and in the Orange Free State.

The concentration of ownership in gold mining was different to that of the diamond industry. Initially the supply of gold was never sufficient to meet the assured demand and the gold price was more or less fixed. In this situation there was no need for a monopoly of production or marketing. Five or so mining groups dominated, notably Hermann Eckstein and Company and Goldfields of South Africa. The groups were owned by mainly London-based holding companies or 'houses', such as Wernher, Beit and Company. In dealings with the Transvaal government[1], the interests of the industry were collectively defended by its local representative body, the Transvaal Chamber of Mines. The combination of a fixed price for the product and the low-grade of the ore made mining more expensive and committed the industry to a constant quest to keep mining costs, particularly wages, low.

The minerals revolution had an immediate impact on the regional economy. Mining towns created an urban market for food and raw materials and became the targets for new railways linking the interior to the British colonial ports and Delagoa Bay (Maputo). The new markets boosted commercial agriculture and, at least initially, black peasant producers. The needs of the diamond and

The Discovery of gold (courtesy of M. Viljoen)

[1] at first the Boer republic, later the British colonial administration under Milner, and ultimately the Union government

gold fields also stimulated coal mining, which subsequently provided the energy for industrial development in South Africa. Mining created a demand for engineers[2], and a broad range of other professional skills. A local commercial community emerged and, to a lesser degree, secondary industry.

By 1914 South Africa produced 38 per cent of the world's gold. South Africa's share of global production peaked in 1970 (almost 70 per cent), and steadily declined thereafter. In terms of Gross Domestic Product (GDP), mining (with gold mining as the most valuable component), remained the sector producing the largest share of the country's wealth until the 1960's, when it was overtaken by manufacturing. Gold is of overriding importance to South Africa's economy: it is the country's major export and the greatest earner of foreign currency. The metal accounts for over 70 per cent of the country's exports for most of the period since the formation of the Union in 1910, and it still totals 59 per cent if the additional value achieved by beneficiation is included (RT6 Granville).

The colonisation of what is now Zimbabwe by Rhodes' Pioneer Column in 1890, under the auspices of the British South Africa Chartered Company, was followed by some mineral discoveries and speculation about a 'second Reef'. These hopes were disappointed, and although mining was of some importance to the local Rhodesian economy, in comparison with the Witwatersrand, its scale was minute.

Gold mining created a demand for skilled workers, which was met by mainly British and colonial immigrants to Kruger's republic. A further change was the steady entry of Afrikaners into mine labour. They were mainly employed, not as skilled artisans, but as supervisors of gangs of black rock drillers. Under the Mines and Works Act of 1911 their jobs were protected by a formal or statutory colour bar. Despite this, fear of displacement by black workers, together with other grievances, led to major strikes and violent protests by white workers in 1907, 1913-14 and 1922. The statutory colour bar was confirmed in the Mines and Works Amendment Act of 1926. No further serious labour disputes involving white workers occurred.

2.2.4 The migratory labour system

The demand for low-paid, unskilled migratory labour was a fundamental feature of the gold mining industry from the start. Without it the profitable deep level mining of low-grade ores would have been impossible. Initially labour was obtained on a voluntary basis, with the support of African chiefs. The main reason for this was the perceived benefit of remittances from workers for the peasant homesteads in the African 'reserves'. At first migrant labour sustained households and preserved peasant agriculture. In the long term, this labour practice, along with economic pressures and legislation[3] that weakened the hold of Africans on the land they cultivated, was destructive. Ultimately migratory labour contributed to the steady impoverishment of rural Africans.

Independent entrepreneurs undertook the necessary recruitment. By the time the South African War began in 1899, there were about 100,000 migratory workers on the gold mines, the largest contingent coming from Mozambique. When the mines re-opened there was a labour shortage as a result of lower wages and alternative employment opportunities that had opened up during the war. The shortage was redressed by the recruitment of Chinese indentured workers. By 1911, the year in which the last indentured workers returned to China, the approximately 54,000 Chinese workers made up about one-third of the migratory work force.

By 1920 the practice of migratory labour had evolved into a system with structural features that remained largely intact for the next fifty years. Wages remained low: economists calculate that between 1897 and 1969 no increase in real wages took place (Wilson, 1972 in Crush *et al.*, 1991). Independent recruitment frequently involved illegalities and coercion, and was expensive and wasteful, therefore recruitment was undertaken by organisations controlled by the mining industry itself: the Witwatersrand Native Labour Association (WNLA) and the Native Recruiting Corporation (NRC). On the mines the compound system ensured the maintenance, by the industry itself, rather than municipalities, of strict discipline over the black workers.

[2] hence the establishment in Kimberley of the South African School of Mines in 1896, followed in 1904 by the Transvaal Technical Institute, the forerunner of the University of the Witwatersrand
[3] such as the Natives Land Act of 1913

Despite these structural features, the system was never entirely stable. In periods of expansion, such as those following the Great Depression and the opening of the Free State gold fields, new sources of supply were needed. By 1961 the migratory system accounted for the employment of 427,000 workers. The sources of supply varied considerably. From 1911 the Chinese were replaced mainly by South African workers recruited from the Eastern Cape. The industry had tried to avoid employing these workers because they preferred shorter contracts and demanded higher wages. After 1911 voluntary workers from within South Africa increased, indicating the greater economic pressures on them to seek work outside the reserves.

In 1913 recruitment from territories north of the latitude 22°S was prohibited, due to the unacceptably high death rate for workers from such territories. This ban remained until 1933. The Portuguese authorities had also set a ceiling on recruitment from Mozambique, and reliance on South African workers increased. In 1936, 58 per cent of black mineworkers originated in South Africa. Thereafter the proportion of foreign workers increased and in 1972 they accounted for 78 per cent of the total. In 1974 all Malawian and most Mozambican labour was withdrawn. Within a few years, 60 per cent of the workers were South African. Significantly, in the years when the proportion of South African workers was high, the mainly negative local impact of the system on the African reserves increased.

On the mines the grievances of black workers were considerable, and desertions, boycotts and compound outbreaks were frequent. In 1920 and 1946 major strikes were forcibly suppressed. Organised resistance was difficult: although black workers could form trade unions they did not have a legal right to strike. The migratory labour system was an integral part of the policy of racial discrimination imposed on the country under both segregation and apartheid. The pass laws and influx control, part of the general policy in South Africa, also sustained the migratory system. Mining was important in the country's economy and to their own revenues, and successive South African governments helped the industry to keep the system in place. Over the years the mining industry itself made no concerted effort to depart from the system, whether through mechanisation, stabilisation of a permanent workforce or abandoning the colour bar.

Since the 1970's the dynamics of change in the migratory labour system have increased dramatically. Wages have risen and black trade unions have gained greater recognition and negotiating power. The political transformation beginning in 1990 has dismantled the apparatus of apartheid.

The cumulative effects of these changes are still in the making. There has been some progress in the advance of black workers into more skilled jobs and some increase in worker productivity. While there has also been stabilisation of a portion of the workforce on a permanently urbanised basis, the essential migratory quality of the mine labour system remains and seems unlikely to disappear soon.

2.2.5 The critical role of coal in the minerals and industrial sectors in southern Africa.

Without the discovery and large-scale exploitation of coal, the rapid industrialisation of South Africa and its emergence as a significant global producer of minerals would not have been possible.

The first commercial exploitation of coal occurred in 1870 at Molteno, and supplied the needs of the Kimberley diamond fields. Shortly after the discovery of gold in 1886, commercial exploitation of coal commenced on the East Rand to supply the needs of the Witwatersrand goldfields. By the end of the 19th century, coal deposits were widely exploited throughout South Africa.

After the Second World War the demand for electricity increased as South Africa underwent rapid and large-scale industrialisation. Numerous coal-fired power stations were erected. The oil crisis of 1973 opened overseas markets to South African coal exports, especially as a result of competitive production costs, a sound infrastructure and the fact that South Africa has more than 70% of the known coal resources of Africa
(Daniel, 1992 in Snyman, 1998).

South Africa ranks 5th in the world in terms of known coal resources and in 1995 it was the 3rd largest coal exporter, earning in that year R8 billion in foreign exchange. In 1996 coal supplied 70 per cent of the country's primary energy needs (Snyman, 1998).

Coal is also present in many southern African countries. It is exploited commercially in Botswana at Morupule, at Wankie in Zimbabwe, Maamba in Zambia and in the Ruhuhu coalfields in Tanzania.

2.2.6 Base metals expansion in Zambia

Mining in Zambia escalated after the South African War. On the Copperbelt, the first claims were pegged at Chambishi, north of Kitwe, in 1903 (Mendelsohn, 1961). The Nkana deposit was discovered in 1910, followed by further discoveries at Mufulira and Kirila Bombwe in 1923 and 1924. At Broken Hill (Kabwe), zinc was produced by 1906 and lead by 1915 (Watts, 1961, in RT6 Granville). Large-scale mining operations and metallurgical plants on the Copperbelt were commissioned between 1929 and 1932 at Nkana and Mufulira, followed closely by Nchanga and later by Konkola (at Kirila Bombwe) in 1957. Kirila Bombwe is now the site of the town of Chililabombwe.

Copperbelt operations were managed privately until after Zambia gained independence in 1964. They were nationalised by the government of Kenneth Kaunda in 1969. In that year, 825,000 t of copper were produced (Coakley, 1995). Declining copper prices in the late 1970's reduced the profitability of the operations and in 1982 the nationalised mines were amalgamated into Zambia Consolidated Copper Mines (ZCCM).

At that time ZCCM was the second largest copper mining operation in the world after Chile's Codelco (Dolley and Coakley, 1996). Continued decline in copper prices and a lack of reinvestment in mining infrastructure resulted in decreasing production by the Copperbelt mines. By 1995 Zambia was ranked 10th in the world in the production of copper, producing 342,000 t compared to Chile's 2,488,000 t (Weaver & Caldwell, 1999). The Copperbelt mines also produce significant quantities of cobalt.

Privatisation of ZCCM began in 1993 under the government of Frederick Chiluba. Negotiations for the sale proved difficult, and agreements for the privatisation of the last major assets were only concluded in 1999. The companies that have invested in the Copperbelt have a real opportunity to help Zambia towards sustainable development, as the minerals sector can generate the wealth needed to stimulate the economy to alleviate unemployment, extreme poverty and the huge backlog of social services. (See Section 3.2.6)

2.2.7 Mining expansion in Tanzania

Tanzania has a variety of mineral resources. These include:

- metallic mineral deposits - iron, nickel, and tin,
- precious metals - gold and silver,
- gemstones - diamonds, ruby, tanzanite,
- industrial minerals - limestone, gypsum, phosphate, and
- fossil fuels - coal and natural gas.

The mining industry developed slowly in Tanzania, largely due to unfavourable mining policies and lack of finance (Mbendi, 2001). In 1985 the government emphasized the mining industry as an important part of reviving the national economy. In 1990 an investment code provided a fiscal regime that attracted considerable foreign and local investment in the mining industry. Between 1995 and 1999, 50 foreign companies acquired 500 prospecting licenses and invested US$297 million in exploration.

In 1999 the sector grew by 27 per cent, and Tanzania is thought to have the largest gold reserves in southern Africa after South Africa. Gold mining has been the driver of major development. By the end of 2002, Tanzania will be producing more than 900,000 ounces of gold a year. That level of production would represent an addition of over US$200 million to Tanzania's exports at today's depressed world gold prices. It is likely that Tanzania will be producing more than 1,500,000 ounces by the middle of this decade (Mbendi, 2001).

The largest mining potential outside gold includes the Kabanga nickel deposit, the large coal reserves in the Ruhuhu area, and the iron reserves in nearby Liganga. These deposits are attracting the interest of some of the largest global mining companies (SADC, 2001a).

Western Deep Levels (courtesy of D. Minnitt)

2.2.8 Factors that stimulated mining

In 1932 South Africa left the gold standard. The gold price doubled within three years, and the gold mining industry experienced major expansion. This expansion stimulated the development of secondary industry in the region.

Sterling was devalued in 1949 and the price of commodities such as copper increased. In 1952 the Northern Rhodesian (now Zambian) colonial government introduced a liberal tax code that allowed new mines to amortize their capital. A surge in copper production resulted, and in 1960 the country was second or third among Western producers (Watts, 1961 in RT6 Granville).

The 1960s were boom years in southern Africa as world demand for metals and minerals grew. The region contributed 3.8 per cent of the value of world mineral production by 1973. South Africa was producing 67 per cent of the region's total, Zambia 12 per cent, Angola 10 per cent, Namibia 6 per cent, Zimbabwe 3 per cent and the other countries the remainder.

Countries of the region were among the top five producers of gold, diamonds, platinum, copper, manganese, vanadium, uranium and asbestos. These mineral resources were regarded as of major strategic and political importance, especially by the USA and USSR.

2.2.9 The minerals industry after the end of the colonial era

The political oppression in Rhodesia and the Portuguese colonies of Mozambique and Angola continued until the collapse of the Portuguese colonial regime in 1975 and the end of the illegal regime in Zimbabwe in 1980. In 1994 the first democratic elections in South Africa signalled the end of formal restrictions on franchise and employment.

Between 1975 and 1990 reform of industrial labour relations in South Africa progressed steadily towards the extension of labour rights to all. Black mineworkers' unions negotiated for better wages and conditions at a time when increasing costs and falling commodity prices were causing mines across the country to cut back on production and employment.

Steep increases in the operating costs of the gold mines were inevitably accompanied by predictions of their imminent demise. Price increases and improved technology deferred the demise, and in 1980 the region was producing over two-thirds of the world's gold. That year was, however, the peak.

Costs increased further with the need to mine at increasing depths, while the gold price dropped steadily as the role of gold in the world monetary system declined. Outdated management structures and old technology, which prevented the mining companies from mining in an efficient and intensive manner, resulted in a decline in production. Eventually large-scale mine closures occurred. SADC countries now produce less than 20 per cent of the world's gold. The closures caused hundreds of thousands of mineworkers to be laid off, with consequent knock-on effects in many other industries.

Production of copper in the region has also declined significantly in the past decade, mainly as a result of lower copper prices and the parlous condition of the state-owned mines of the Zambian Copperbelt (Dolley & Coakley, 1996; Limpitlaw, 1998), which have now been privatised.

Production of some other minerals in SADC countries has increased. For example, chromite increased from 32 per cent to 51 per cent of world production over 1993-1998, while platinum production has held steady at two-thirds of world supply (BGS, 1999 in RT6 Granville). Coal production in South Africa almost doubled between 1980 and 1998 (Segal, 2000 in RT6 Granville). A positive trend is also apparent in the significant exploration (see Figure 2.5) being undertaken in African countries, and mineral production can be expected to grow.

2.3 The current state of the mining and minerals processing sector

2.3.1 Mining remains the economic cornerstone of economies

Today, despite recent adverse economic features and depressed commodity prices for many metals and mineral products, mining and its associated industries continue to form the cornerstone of the economies of most southern African countries (see Table 2.1, Figure 2.2 and Table 3.5).

The climate in terms of government policy, laws and regulations also affects the level of private sector mining investment. In recent years this has, in some instances, resulted in slow progress in the development of the mining industry in certain SADC countries.

In Zambia the minerals industry accounts for about 10 per cent of employment, and copper and cobalt account for 77 per cent of total exports (Coakley, 1998). When processed minerals and metals are included, the contribution of the minerals sector of SADC rises from 8 per cent of the region's GDP to some 10 per cent, and its contribution to foreign exchange earnings from 43 per cent to 60 per cent (Granville *et al*., 2000, in RT6 Granville).

These figures show that mining plays a critical role in the economies of southern Africa but do not show the sector's significant contribution to the informal economy. Small scale mining is an important source of income for many people in the region and is likely to grow in importance. It is estimated that, in a number of southern African countries, small scale mining contributes up to 5 per cent of GDP, and in Zimbabwe and Tanzania, for example, small scale miners contribute up to 25 per cent of the total gold production (RT1 ITDG). Small scale mining is estimated to have accounted for between 15 - 20 per cent of the world's non-fuel mineral production (Hentschel *et al*. 2001).

Table 2.1: *Contribution of southern Africa to world mineral production Sources: (BGS, 2000; USGS, 2000; Minerals Bureau, 2000; Granville et al., 2000; SADC, 2001; all in RT6 Granville); (Schneider pers. comm., 2001).*

Mineral	per cent, 1998	Countries with contribution greater than 5 per cent	Other regional producers
Alumino-silicates[#]	59	RSA	
Asbestos*	n/a	Zimbabwe, RSA, Swaziland	
Chromite	51	RSA	Zimbabwe
Coal	7	RSA	Zimbabwe, Botswana, Swaziland, Zambia, Tanzania, Malawi
Cobalt	42	Zambia, DRC	Botswana, RSA, Zimbabwe
Copper	4		Zambia, RSA, Botswana, Namibia, Zimbabwe, DRC
Diamonds**	46	DRC, Botswana, RSA	Angola**, Namibia, Tanzania, Swaziland, Zimbabwe, Lesotho[##]
Ferrochrome	49	RSA, Zimbabwe	
Gold	19	RSA	Zimbabwe, Namibia, Tanzania, Botswana
Iron ore	3		RSA, Zimbabwe
Manganese	18	RSA	Namibia, Botswana, Zambia
Nickel	7		RSA, Botswana, Zimbabwe
Phosphate rock	2	RSA	
Platinum-group Metals	49	RSA	Zimbabwe
Semi-precious stones[##]	n/a	Tanzania, Zambia	RSA, Malawi, Botswana, Namibia
Steel	1		RSA, Zimbabwe, DRC
Titanium	20	RSA	
Vanadium	61	RSA	
Vermiculite	45	RSA	
Zinc	2		Namibia, RSA

[#] andalusite, kyanite, sillimanite; * not available; ** not including smuggled diamonds;
[##] small scale mining.

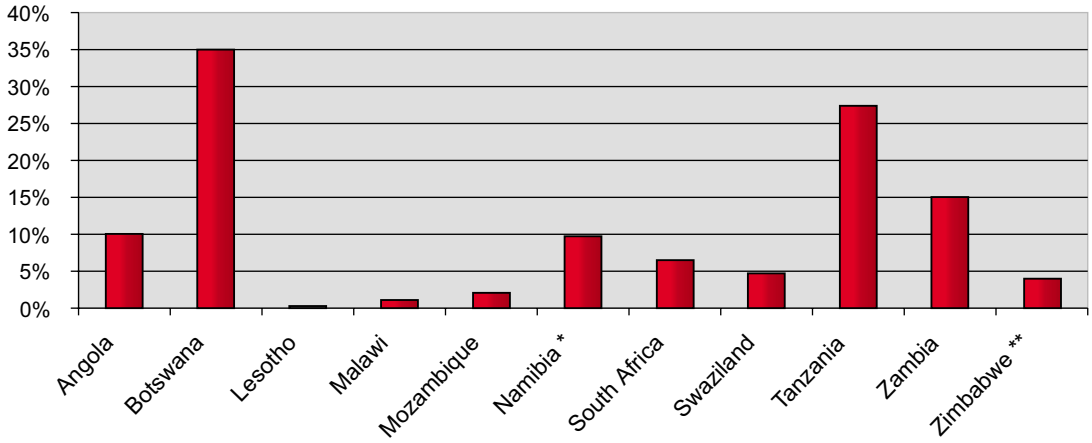


Figure 2.2: *Contribution of mining to GDP, selected countries (source: SADC 2001 in RT5 MacFarlane).*
** Some authorities consider mining's direct contribution to Namibia's GDP to be 15% (Schneider, pers. comm.,2001).*
*** Figures for Zimbabwe from Murangari (pers. comm., 2001). The contributions to GDP listed above exclude the significant indirect contribution arising from the activities of the sector. No data was available for the Democratic Republic of Congo.*

To form a complete picture of the way in which mineral wealth contributes to, or detracts from, sustainable development, cognisance should be taken of the extent to which minerals fuel civil wars and undermine governments and economies. Between 1992 and 1997 UNITA, the Angolan rebel movement, is estimated to have earned US$ 3.7 billion from the sale of conflict diamonds. In 1999 alone, the movement is estimated to have earned US$ 150-200 million (MMSD 2001c).

In 1999 a South African was accused by the South African government of bankrolling the Kabila government in the war in the DRC. He allegedly used profits from cobalt and copper exploitation in the DRC to reimburse the Zimbabwean government for its involvement in the Congo war (Powell, 1999).

Hundreds of thousands of civilians or military personnel have been mutilated and injured, or have died, in the wars funded partly by conflict diamonds (MMSD 2001c).

United Nations sanctions against the trade in Angolan conflict diamonds, introduced in 1998, had very limited impact. De Beers voluntarily stopped purchasing any diamonds whose origins were not certifiable (pers. comm., Tweedy, 2002). The South African government, with other major producer and consumer governments, initiated the Kimberley Process, which involves industry, governments and NGOs. The Kimberley Process recognises "…that the possibilities for conflict diamonds to play a role in fuelling armed conflict can be seriously reduced by submitting the international trade in rough diamonds to a certification scheme that would guarantee, to the maximum extent practicable, the absence of conflict diamonds in that segment of internationally traded rough diamonds" (Government Communications, 2001a).

The Kimberley Process could, if successful, be used as a precedent for regulating the use of other minerals to eliminate their role in funding civil unrest and armed conflict.

2.3.2 Major minerals and metals

The following minerals and metals have been of major importance in the history of mining development in southern Africa: chromium, coal, cobalt, copper, diamonds, gold, iron, manganese, nickel, phosphates, platinum-group metals (PGMs), semi-precious stones, lead, zinc and titanium. Over 60 minerals are mined in the SADC region and exported to over 100 countries worldwide.

Southern Africa is one of the world's most mineral-rich regions, and the economies of most of the states in the region have grown as a direct result of the development of mining operations. Table 2.2 shows the southern African share of world mineral reserves.

2.3.3 Minerals processing

Development of the mineral processing industry in the region has progressed from primitive fire-smelting of single metals to the stage where mineral products are used in manufacturing. In the South African Government white paper, "A Minerals and Mining Policy for South Africa", beneficiation is described as successive processes of adding value to raw materials. These processes of value addition, reflected in Table 2.3, include mining a mineral from underground, concentrating it and converting it into an intermediate product, refining it for use in primary manufacturing and final conversion into a manufactured product (Baxter, pers. comm., 2001).

Table 2.2: *Southern African proportion of world mineral reserves (Baxter, pers. comm.., 2001).*

Commodity	SADC Country	Percentage of Global Reserves	Total percentage in SADC
Gold**	South Africa	35.0	
PGMs	South Africa	55.7	
	Zimbabwe	8.9	64.6
Silver	South Africa	2.4	2.4
Coal	South Africa	10.9	10.9
Hydrocarbon fuels	-		
Uranium	South Africa	9.4	
	Namibia	6.7	16.1
Cobalt	DRC	26.0	
	Zambia	5.6	
	South Africa	0.2	31.8
Copper	Zambia	5.2	
	DRC	4.6	
	South Africa	2.0	11.8
Lead	South Africa	2.1	2.1
Nickel	South Africa	8.4	
	Botswana	0.6	
	Zimbabwe	0.2	9.2
Titanium	South Africa	20.4	20.4
Zinc	South Africa	3.5	3.5
Chromium	South Africa	68.3	
	Zimbabwe	20.5	88.8
Iron Ore	South Africa	0.9	0.9
Manganese	South Africa	80.0	80.0
Vanadium	South Africa	44.5	44.5

* reserves data unavailable,
** only South African gold reserves data available

Possible stages of transformation are shown in Figure 2.3. The furthest stage of transformation achieved in each southern African country for selected major minerals is listed in Table 2.3.

Stage	Mineral beneficiation process catergory	Process flow-chart	Labour	Capital
1	The action of mining and producing an ore or concentrate (primary product)	Run-of-mine ores → Washed & sized concentrate	High	High
2	The action of converting concentrate into a tonnage product (such as a metal or alloy)	Mattes/slags/ bulk chemicals → Ferro pure	Low	High
3	The action of converting the intermediate goods into refined product suitable for purchase by both small and sophisticated industries (semis)	Steel/alloys → Worked shapes & forms	Low	High
4	The action of manufacturing a final product for sale	Worked shapes & forms → Worked shapes & forms	Medium to High	Medium to High

Figure 2.3: *The four stages of the minerals beneficiation process (Baxter, pers. comm., 2001).*

Table 2.3: *Stages of processing achieved in southern Africa for selected commodities (RT6 Granville, Ireton, pers. comm., 2001, King, pers. comm., 2001).*

Commodity	Product	Beneficiation Stage	Country
Aluminium	Aluminium	Stage 3	South Africa, Mozambique
Chromium	Stainless steel	Stage 3	South Africa
Chromium	Ferroalloy	Stage 2	Zimbabwe
Cobalt	Manufactured product	Stage 4	South Africa
Cobalt	Metal	Stage 2	DRC, Zambia
Cobalt	Salt	Stage 2	Zimbabwe
Cobalt	Matte	Stage 2	Botswana
Copper	Manufactured product	Stage 4	South Africa, Zambia, Zimbabwe
Copper	Metal	Stage 2	DRC
Copper	Matte	Stage 2	Botswana, Namibia
Copper	Copper concentrate	Stage 1	Mozambique
Diamonds	Rough	Stage 1	Angola, DRC, Lesotho, Swaziland, Zimbabwe
Diamonds	Cut	Stage 4	Botswana, Mauritius, Namibia, South Africa, Tanzania
Gold	Bullion	Stage 2	Botswana, DRC, Mozambique, Namibia, Tanzania, Zambia, South Africa, Zimbabwe
Gold	Fabricated product	Stage 4	South Africa, Zimbabwe
Iron	Manufactured products	Stage 3 and 4	Angola, Botswana, DRC, Lesotho, Malawi, Mozambique, South Africa, Zambia, Zimbabwe
Manganese	Ferro-alloys, manganese steel products	Stage 2	South Africa
Nickel	Matte	Stage 2	Botswana
Nickel	Metal	Stage 2	Zimbabwe, South Africa
Nickel	Stainless steel	Stage 3	South Africa
Platinum group metals	Concentrate	Stage 1	Zimbabwe
Platinum group metals	Manufactured product	Stage 4	South Africa
Ilmenite	Titania slag	Stage 2	South Africa

In southern Africa the mining industry has been pivotal in the development of infrastructure and the establishment of manufacturing industries. Manufactured products have been produced in nine SADC countries, mainly in the iron and steel and copper industries. Governments are now encouraging downstream development of, for example, the jewellery industry.

Although the direct contribution of mining to the economies of SADC countries has varied during the past 30 years, the importance of manufacturing industries based on a wide variety of minerals has grown substantially.

The economic contribution currently made by mining to the economies of mainland SADC countries are highlighted in Table 2.4. This excludes associated industries and beneficiation programmes.

The economic benefits attributable to the mining sector are reflected in the contribution to direct foreign exchange earnings in each country. The economies of Angola, Botswana, DRC, Namibia, South Africa, Tanzania, Zambia and Zimbabwe obtain between 22 per cent (Tanzania) and 90 per cent (Angola) of their foreign exchange directly from mining and mineral exploitation activities. The high percentage contribution to Angola's direct foreign exchange earnings is as a result of oil production, as well as the mining and minerals sector.

Table 2.4: *SADC countries: Mining outputs and GDPs (Granville et. al., 2000 (for 1997); Van Rensburg, 1977 (for 1973) both in RT6 Granville)*

Country	GDP (US$m) 1997	Mining output 1997 (US$m)	Mining as per cent of total GDP*	
			1997	1973
Angola	7,830	705	9	15
Botswana	5,713	1,942	34	10
DRC	11,730	469	4	29
Lesotho	1,054		<1	0.3
Malawi	1,721	52	3	0.1
Mautitius	4,596			
Mozambique	1,801		<1	0.2
Namibia	3,150	473	15	69
Seychelles	530			
South Africa	140,020	11,202	8	16
Swaziland	1,101	52	5	17
Tanzania	4,542	45	1	1
Zambia	3,913	419	11	41
Zimbabwe	7,848	314	4	9
SADC	**195,549**	**15,673**	**8**	**16**

* at current prices

Overall, it is conservatively estimated that mining contributed an average of 40 per cent to the direct foreign exchange earnings of SADC countries in 2000 (Mbendi, 2000; CIA, 2001 in Hounsome & Ashton, 2001). The estimates of foreign exchange earnings are likely to be on the conservative side as they exclude the economic contribution made by informal miners to the economies of several countries.

Despite the prevailing economic pressures on the mining industry, the mining sector in the twelve mainland SADC countries directly employed 1,5 million people in 1999 (SADC, 2001b). This represented 2.3 per cent of the region's total available workforce, which was estimated at 68 million in 1999 (CIA, 2000). Employment in the sector increased to two million in 2000, not including informal miners, except in Tanzania. (SADC, 2001b). While these figures do not account for the millions of people dependent on miners' incomes for their livelihoods, they do emphasize the importance of the mining sector as a source of employment.

2.4 Trends in mining's contribution to the economy

(Where SADC figures are not available, South African figures are quoted.)

2.4.1 Gold and the South African economy

The contribution of all mining, as a proportion of GDP for the region, was lower in 1997 than in 1973. A chart for South Africa (Figure 2.4) shows that the proportion was approximately constant at around 12 per cent until the early 1970s and peaked in 1980. This increase resulted mainly from high commodity prices, especially for gold. The price of gold increased at an average annual rate of 37 per cent in both US dollars and South African Rand over the decade 1970 to 1980 (Segal, 2000, in RT6 Granville). Since then the proportional contribution of all mining in South Africa has been in continuous decline.

Between 1992 and 1999 the nominal value of mining output in South Africa increased from R26.6 billion to R44.2 billion at current prices (Loxton, 2001 in RT6 Granville). Inflation was a major contributor to this increase. The slowdown in mining has continued, and growth in this sector in South Africa was only 0.1 per cent in the first quarter of 2001 (Ebersohn, 2001 in RT6 Granville).

Mining contributed 43 per cent to the SADC region's exports in 1997. In South Africa there has been a persistent decrease in the mining contribution - from 62 per cent in 1980 to 35 per cent in 2000 (Jourdan, 1993, COM, 2001 both in RT6 Granville). When beneficiated minerals are included with primary minerals in South Africa's exports for 2000, the total contribution to exports increases to 59 per cent (Segal, 2000 in RT6 Granville).

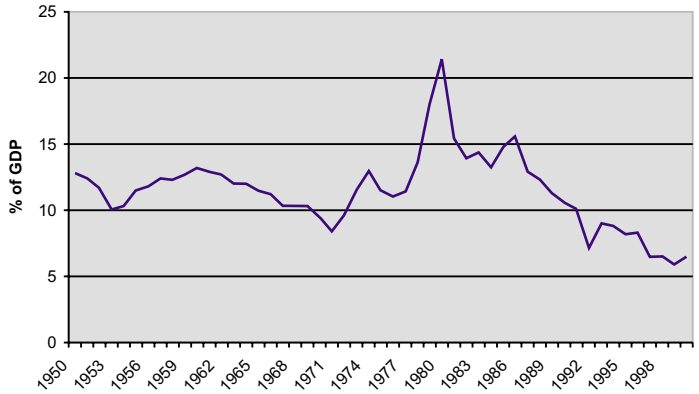


Figure 2.4: *Contribution of mining to South African economy, (1950-1999: RT6 Granville; 2000: Baxter, pers. comm., 2001).*

An aspect of the relative decline of mining's contribution to the South African economy is decreased government revenue. Mining companies contributed only 1 per cent to South African government revenue during the 1990's, compared to 12 per cent in the 1970s and 1980s (Segal, 2000 in RT6 Granville). This is because revenue is dependent on taxation of profits, and not on royalties. Revenues from diamond mining also decreased, principally as a result of declining prices.

2.4.2 Future prospects

The image of the mining industry as an industry in decline is changing. For example, gold, which accounted for over 60 per cent of South Africa's mineral sales in 1983, now accounts for ess than one third (Minerals Bureau, 2000 in RT6 Granville), but other minerals have collectively replaced it in significance. With the exception of gold and manganese, all of South Africa's major minerals have experienced long-term growth (Segal, 2000 in RT6 Granville). The output of three sectors - coal, platinum group metals and chrome - has doubled since 1980, and the non-gold component of mining grew faster than the overall economy from 1980 to 1998. Prospects are good for the further growth of these minerals and their eventual compensation for the decline of gold in mining's share of GDP.

There are also good prospects for the revival of mining in other SADC countries such as Tanzania. It is likely that the common misconception that mining is declining in importance in the economies of nations is not correct for the SADC countries, in spite of the fact that the prices of most minerals have been declining on a long-term basis and that most mineral economists believe that they will continue to decline (RT6 Granville).

The above discussion refers to the direct contribution of mining to the regional economies. Indirect contributions include:

- capital formation: gross domestic fixed investment, attraction of foreign and domestic capital (COM, 1999 in RT6 Granville),
- forward linkages: material inputs into other industries (e.g. energy generation),
- backward linkages: purchase of goods and services from domestic industry,
- income terms of trade multiplier: the impact on foreign exchange earnings and the balance of payments,
- consumption expenditure by mine employees, and
- social multipliers: employment, health care, education and physical infrastructure.

The increase in exploration activity is evidence of a potential improvement in mining's contribution to the economy. In 1997, US $ 86 million were spent in eight countries in the region (See Figure 2.5). The continent's share of world exploration spending was estimated at 17.5 per cent in 1998, up from 7 per cent in 1993 (Segal, 2000, in RT6 Granville).

The mining and minerals industry has been the economic cornerstone of southern Africa. The wealth generated by this industry has not always been used to rehabilitate environmental degradation caused by mining, nor to benefit the communities affected by the industry. In spite of this history, current trends in the mining and minerals industry indicate that it can contribute to the region's move towards sustainable development. The industry remains a most significant factor in the region's future development.

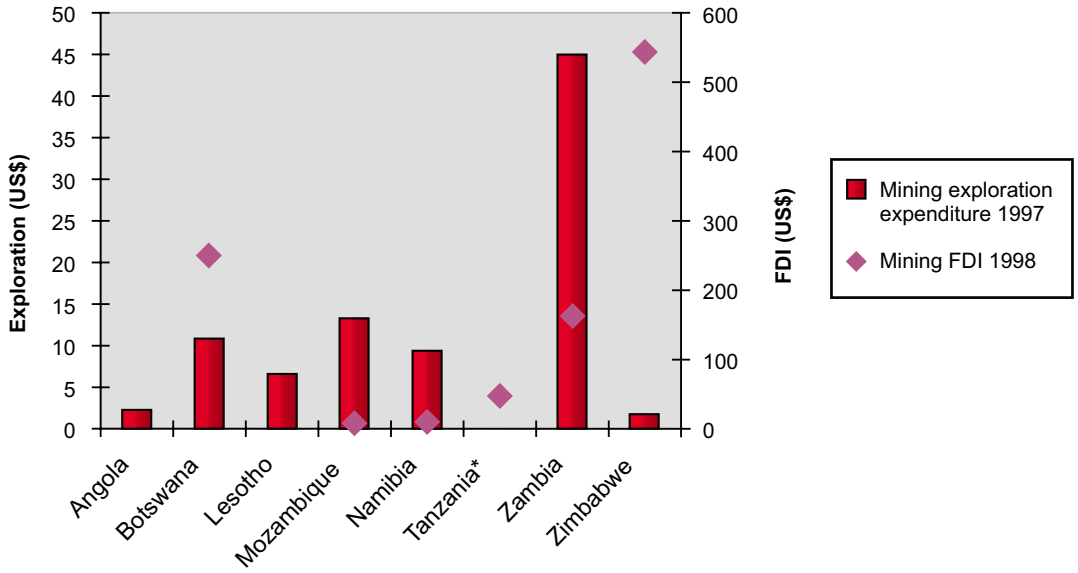


Figure 2.5: *Mining exploration expenditure 1997 and Mining FDI 1998 (Source: Segal, 2000, in RT6 Granville). Data in US$ millions.*
** Exploration expenditure for Tanzania not available. This is the latest data available, and no data was available for the Democratic Republic of Congo, which is an important part of the mining and minerals sector in southern Africa.*

Indirect contributions by mining to the economy include health care - AngloGold's Lusikisiki Medical Centre (courtesy of AngloGold)

3. THE OPERATING CONTEXT FOR THE MINING AND MINERALS SECTOR IN SOUTHERN AFRICA

3.1 Introduction

The natural environment forms the substrate for all human activities. This substrate provides life-supporting services such as recycling and purifying water, converting solar energy into biomass and removing wastes. The health of the substrate is critical to our prosperity and to any prospect of future sustainable development.

Ecologically, much of southern Africa falls within the biologically rich Zambezian regional centre of endemism[4]. This is characterised by savannahs that extend from 3°S to 26°S, through ten countries. The diverse savannah vegetation has a high carrying capacity and supports a large variety of animal species. There are great potential benefits to be derived from harnessing this biological resource. However, unsustainable exploitation of faunal and floral resources through land use changes and hunting could threaten ecological stability and sustainable growth in the region.

Richness in species is not matched by an abundance of water and arable land. Much of the region is characterised by low rain fall and poor soils. This results in water scarcity and food insecurity, a condition that is aggravated by contributory factors such as poor governance.

Southern Africa, despite its great mineral wealth, is one of the poorest regions on the globe. With a daily per capita income of less than US$ 1 per day, Mozambique, Tanzania, Zambia and Zimbabwe are extremely poor. The average for all of SADC is just above US$ 2. The corresponding amount for the United States is about US$ 90 per capita per day (RT5 Cawood).

Widespread poverty is aggravated by political turmoil. In the last 150 years, all the southern African states have experienced violent conflict. Wars are currently being waged in Angola and the DRC. In South Africa the legacy of apartheid is still part of the country's context. The rich mineral resources of the region fuel much of this conflict (RT5 Cawood).

The southern African mining and minerals sector comprises a range of actors, including small scale miners, mining companies and associated industries, national ministries, NGOs, labour unions and research institutions. The roles and responsibilities of these actors vary, but a characteristic of the sector is that all players operate within a context defined largely by poverty, underdevelopment and instability.

Settlement adjacent to a tailings dam in Gauteng, South Africa (W. Hoadley)

[4] Endemic plants and animals are native to (and often restricted to) a particular geographical area (Shorter Oxford English Dictionary, 1993).

This section outlines the context in which the mining and minerals sector operates in southern Africa. The four components, which form the basis of sustainable development thinking, are governance, economics, society and the biophysical environment. Whether this context is a constraint or an opportunity depends on the actor. For example, low literacy levels have historically provided mining companies with an abundance of cheap, unskilled labour. For most small scale miners, however, poverty and lack of skills are major constraints to changing subsistence activities into more profitable ventures.

Actors in the sector also influence their context. A number of the larger mining companies have generally made significant efforts to reduce the environmental impact of their activities. Conversely, the cumulative environmental impact of the growing small scale mining sector is increasing due to a lack of awareness and the inability to implement environmentally friendly technologies and management programmes (RT4 Ashton *et al.*).

MMSD SOUTHERN AFRICA produced a document (Appendix 1) on sustainable development within the context of the mining and minerals sector in the region. This description provided a platform for debate and discussion with stakeholders, and has been revised on the basis of a wide range of comments received.

3.2 Governance

Systems of government in the region are diverse, ranging from liberal democracies, with devolution of power to local levels, to authoritarian states. Conflict and extreme instability make characterisation of the system of government in some countries difficult. A lack of capacity to implement policy is a characteristic of governments throughout the region.

Governance is not solely the state's responsibility - it is the responsibility of all stakeholders. Good governance is essential if the region is to advance towards sustainable development. Governance relating to specific issues is also discussed in sections 4.2.1, 4.3.6 and 4.6.3.

Figure 3.1, compiled by the global MMSD process, reflects the position of selected mineral economies in the spectrum of governance performance for 155 countries. Lines for mineral economies are shown in bold. Former mineral economies are shown in *italics*. Three former significant mineral producers are shown in parentheses. High positive values indicate strong governance; low negative values indicate poor governance.

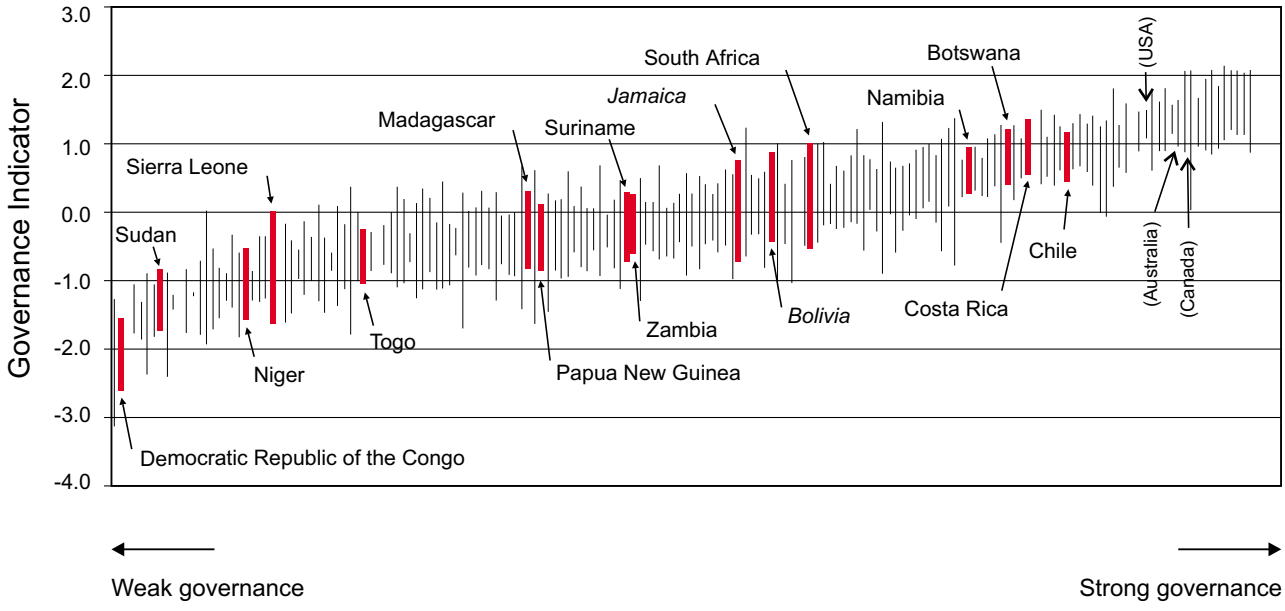


Figure 3.1: *Mineral economies and governance (MMSD 2001d). For a discussion on the Governance Indicator, see MMSD 2001d.*

3.2.1 Corruption

Corruption is an obstacle to the equitable distribution of mining revenues, locally and nationally. Some companies in the minerals sector collude with officials in illicit activities, usually bribery (MMSD 2001e). The motives for such actions are often the interests of business efficiency, but the real effects are to undermine the social fabric of a country, distort the government's priorities, undermine overall efficiency and ultimately to slow down economic growth. Revenue that should be used for development is diverted, and a strong link is apparent between high levels of corruption and low levels of human development (MMSD 2001e).

Mature democracies also suffer from corruption, but in poorer countries the opportunities for corruption are greater and the systems of control weaker. Many public officials are vulnerable because of low wages, and the temptation to supplement their incomes by demanding or accepting bribes is great. Weak bureaucratic and management systems compound the problem. Many officials work with little or no supervision and have wide powers of discretion which place them in a position to make decisions that have significant implications for mining companies. Corrupt officials are aware that the chances or being caught and punished are slim, as systems of financial auditing are weak or also corrupted (MMSD 2001e).

Table 3.1 is based on the 2000 Corruption Perceptions Index (CPI) produced by Transparency International. A disturbing message from the CPI is that corruption seems to be highly prevalent in countries that have the highest natural resource endowments. Of the 32 leading mineral countries included in the CPI, 23 score less than 5.

Table 3.1: *Corruption Perceptions Indices for 2000 and 2001 (TI, 2001).*

Country	2000 CPI Score	2000 Rank	2001 CPI Score	2001 Rank
Finland	10.0	1	9.9	1
Denmark	9.8	2	9.5	2
New Zealand	9.4	3	9.4	3
Chile	7.4	18	7.5	18
Botswana	6.0	26	6.0	26
Namibia	5.4	31	5.4	30
South Africa	5.0	34	4.8	38
Malawi	4.1	46	3.2	61
Zambia	3.4	58	2.6	75
Zimbabwe	3.0	67	2.9	65
Tanzania	2.5	77	2.2	82
Mozambique	2.2	81	Not rated	Not rated
Angola	1.7	85	Not rated	Not rated

CPI score relates to perceptions of the degree of corruption as seen by business people, risk analysts and the general public and ranges between 10 (highly clean), and 0 (highly corrupt).

3.2.2 The new partnership for Africa's development (NEPAD)

This widely supported initiative recognises that sustainable development can only occur when good governance and a lack of corruption underpin progress.

Article 71 of NEPAD states: "African leaders have learnt from their own experiences that peace, security, democracy, good governance, human rights and sound economic management are conditions for sustainable development. They are making a pledge to work, both individually and collectively, to promote these principles in their countries, sub-regions and the continent (Government Communications 2001b, p 16).

The participating countries have further committed themselves to 'undertake a process of targeted capacity-building initiatives' (Government Communications 2001b, p 18). These institutional reforms will focus on:

- adopting effective measures to combat corruption and embezzlement,
- co-ordinated mechanisms to combat corruption effectively…,
- promoting and protecting democracy and human rights in their respective countries and regions, by developing clear standards of accountability,
- transparency and participatory governance at the national and sub-national levels, and
- taking the lead in supporting initiatives that foster good governance."

Article 80 states: "The purpose of the Democracy and Governance Initiative is to contribute to strengthening the political and administrative framework of participating countries, in line with the principles of democracy, transparency, accountability, integrity, respect for human rights and promotion of the rule of law" (Government Communications 2001b, p 18).

Small-scale Mining near Witbank, South Africa (L. Danielson)

3.2.3 Governance and regulation of the small scale mining sector

In Tanzania, Zambia and Zimbabwe the small scale mining sector is extensive. In Malawi, Mozambique and South Africa, widespread small scale mining is a relatively recent phenomenon, which governments have tended to ignore. This situation is slowly changing as the growth of the sector and the impacts of its activities increasingly demand co-ordinated intervention from government agencies. However, currently the sub-sector generally lacks organised structure, and most governments do not have an adequate counterpart to communicate with (Hentschel *et al.* 2001).

Attempts to promote cooperation between small scale miners have not been sufficiently widespread to effectively address the governance issues in this sub-sector. The sub-sector is characterised by severe poverty, leading to desperation and lawlessness (RT1 ITDG). Women constitute a significant number of small scale miners in the region. They make up an estimated 30 per cent in Zambia and 25 per cent in Tanzania (Hentschel *et al.* 2001), mainly in subordinate positions and on inequitable terms (see Section 4.2.6).

Although figures are unavailable, extensive use is made of child labour in small scale mining operations (see Section 4.2.7). Children start at the age of three, washing gold, and from the age of six they are breaking rocks and washing ore. By age twelve, many children are working underground. These children usually do not go to school, or they attend sporadically. A lack of legislation and/or enforcement and labour inspection ensures the continuation of this system (Hentschel *et al.* 2001).

These characteristics are impediments to the transition to sustainable development, and the implementation of effective governance, coupled with significant support from other stakeholders, is required.

3.2.4 Management of the HIV/AIDS pandemic

Table 3.2 shows the catastrophic proportions of the HIV/AIDS pandemic in a number of SADC countries. Initiatives that aim to control the spread and manage the treatment of HIV/AIDS are partly obstructed by poor governance, corruption, political instability and the inappropriate utilisation and channelling of donor funding. It happens that government, instead of taking the lead in HIV/AIDS initiatives, creates confusion and denial, as have the pronouncements of the South African government (Evian, 2001).

Table 3.2: *Selected prevalence data for SADC member states - 2000. (RT2 Elias et al.: Table compiled from June 2000 UNAIDS Epidemiological Fact Sheets, http://www.unaids.org/hivaidsinfo/statistics/ june00/fact_sheets/)*

	Adult prevalence (per cent)	Estimated number of infected people	Women (15 - 19)	Children (0 - 14)
Angola	2.8	160 000	82 000	7 900
Botswana	35.8	290 000	150 000	10 000
DRC	5.1	1 100 000	600 000	53 000
Lesotho	23.6	240 000	130 000	8 200
Malawi	16.0	800 000	420 000	40 000
Mozambique	13.2	1 200 000	630 000	52 000
Namibia	19.5	160 000	85 000	6 600
South Africa	19.9	4 200 000	2 300 000	95 000
Swaziland	25.3	130 000	67 000	3 800
Tanzania	8.1	1 300 000	670 000	59 000
Zambia	20.0	870 000	450 000	40 000
Zimbabwe	25.1	1 500 000	800 000	56 000

3.2.5 Gender equity

With the exception of Swaziland, all governments in the SADC region have signed the United Nations Convention on the Elimination of All Forms of Discrimination Against Women. These governments have committed themselves to ensuring equal rights for women in both policy and practice (RT3 Ranchod). Lesotho, Mozambique, South Africa, Swaziland, Tanzania and Zimbabwe have identified the economic and political empowerment of women as national priorities (RT3 Ranchod).

In individual countries in the region, gender equity policies are being enacted in the mining sector. In South Africa, adoption of laws, such as the Mine Health and Safety Act of 1996, repealed previous legislation prohibiting women from working underground (RT3 Ranchod).

For the last fifteen years mining has been a job-shedding industry in South Africa. This, together with the factors discussed in sections 3.4.3 and 4.4.4, means that the enabling policies and legislation allowing women to participate in mining in South Africa have generally not translated into practice.

3.2.6 Privatisation and economic restructuring

Most countries in the SADC region have adopted policies to encourage private sector participation in the economy, including in the mining sector. Lesotho, for example, is currently drafting a new Minerals Act to encourage private investment in the sector, and similar restructuring of policies has been undertaken in Angola and the DRC (SADC Mining Sector Annual Report, 2001-2003, in RT3 Choshi).

Privatisation implies less direct government involvement in the economy, and increased chances for the skewed distribution of benefits. This has implications for governance. Large-scale privatisation programmes, such as that in the Zambian Copperbelt, have the potential for widespread economic benefits, but oblige governments to safeguard the rights of their citizens. This obligation includes the provision of an institutional framework within which social management can be monitored (RT3 Kangwa). The social management plans for Konkola Copper Mines in Zambia have ensured that, before retrenchments take place, the retrenchee will be trained and equipped with skills to promote alternative livelihoods. The retrenchee can also nominate another family member for training (Kapelus pers. comm., 2001).

3.2.7 Local development and social management

In southern Africa, national governments are responsible for mineral affairs. For South Africa, the commitment of government to sustainable development is captured in the statement that the development of mineral resources will take place within the framework of "sustainable development and environmental management…" (Department of Minerals and Energy, 2000, p 76, in RT3 Choshi).

The Department of Minerals and Energy of South Africa (1998 in RT3 Choshi) stresses that mining companies will be required to comply with the integrated development planning of municipalities within which they operate. They will also be encouraged to promote community empowerment by conducting their business in such a manner that the needs of local communities are considered.

The Department of Constitutional Development of South Africa (1998 in RT3 Choshi) proposed the concept of *developmental local government*. The key provisions of developmental local government include integrating and co-ordinating public and private investment, democratising development, building social capital and promoting socially just and equitable metropolitan governance (RT3 Choshi). Other countries in southern Africa, such as Namibia, Botswana, Mozambique and Malawi, have also moved towards developmental local government, and there is, in the region, a strong recognition of the potential to link minerals development with regional development planning (Kapelus pers. comm., 2001).

3.2.8 Resettlement

Landlessness is arguably the greatest threat to displaced rural communities - usually the groups adversely affected by mining activities. Security of tenure is therefore central to a discussion on resettlement in southern Africa. Without it, displaced communities may be at risk of losing land and livelihoods without receiving appropriate compensation for such losses. Insecure land tenure is an issue that remains common to most southern African countries, despite recent efforts at land reform in a number of them (RT3 Sonnenberg & Münster).

It is not possible to provide an accurate estimate of the number of people who have been resettled as a result of mining in southern Africa. The figure of 35,000 (RT3 Sonnenberg & Münster) given for the last decade only reflects those resettlements for which formal resettlement plans have been compiled. It is reasonable to assume that many unrecorded resettlements, which have not followed best practice guidelines, and which involve many thousands more people, have occurred (RT3 Sonnenberg & Münster). A significant feature of resettlement is that it often affects people who have little access to resources and who benefit least from the new mining development.

National frameworks and legislation guiding resettlement are generally weak or non-existent (RT3 Sonnenberg & Münster). In South Africa, there is a range of laws and initiatives dealing with some of the components of resettlement and a multiplicity of government departments are drawn into the resettlement process (RT3 Sonnenberg & Münster). No clear policy or single comprehensive law exists.

3.2.9 Environmental protection

Southern African countries have generally responded to the threat of environmental degradation by developing National Conservation Strategies and National Environmental Action Plans. Many of these have devolved to district level, for example in Zambia and Zimbabwe, and are supported by international development and aid organisations (Chenje, 2000 in RT4 Ashton *et al.*).

Programmes such as the Biodiversity Strategic Action Plan address biodiversity issues and pollution prevention. These are implemented at national and regional levels with support from both the private sector and international development aid agencies (RT4 Ashton *et al.*).

Every southern African country has legislation, regulations and

Revegetated dump, City Deep, Johannesburg, South Africa (courtesy of M. Viljoen)

Kawama Resettlement Village, near Konkola Copper Mine, Zambia (B. Liggitt)

environmental standards that aim to control developments that impact on the environment. Further measures encourage the participation of stakeholders (RT4 Ashton *et al.*). The regulation, monitoring and enforcement of such well-intentioned legislation are, however, hampered by a lack of resources, inadequate technical capacity and poor national and regional co-ordination (Chenje, 2000; in RT4 Ashton *et al.*). Different government ministries are usually responsible for different aspects of environmental regulation. Enforcement is difficult, and mining companies are subject to a variety of legislation administered by different ministries or authorities. This is further complicated by the different levels of regulation applied to different types of operators: large-scale mines are highly regulated while small scale miners operate illegally in many instances.

In the absence of proper co-ordination and clear allocation of responsibility, it becomes difficult to develop and implement cost-effective management strategies to minimize and control environmental impacts (Chenje, 2000; in RT4 Ashton *et al.*).

Small-scale mining in lower Gweru, Zimbabwe (courtesy of M. Viljoen)

3.3 Economic context

Section 3.1 refers to the widespread poverty in the region. The economies in the region generally underperform by world standards and are highly dependent on the mining and minerals industry.

Gross domestic product (GDP) figures for southern African countries are considerably lower than those for developed countries. Tanzania, for example, has a per capita GDP two orders of magnitude lower than that of a country like the Netherlands at US$ 23,100 (CIA 2000).

3.3.1 Factors contributing to poor economic performance

The International Monetary Fund (IMF) has identified a number of factors that have contributed to the relatively poor performance of economies in sub-Saharan Africa (RT5 MacFarlane).

- An imbalance in the levels of governmental spending, especially in the area of military budgets which from spending on value adding activities.
- A shortage of human capital results from low literacy levels, loss of high level skills and inadequate health care.
- A shortage of private and corporate investment is largely the result of unfavourable investment climates.
- Uneven progress on macroeconomic stabilisation policies results in countries with lower inflation rates and fiscal deficit to GDP ratios exhibiting higher growth rates than those with higher inflation rates. This causal relationship is important as an indicator of the potential of the region to increase growth rates in the future. Table 3.4 reflects encouraging trends in SADC countries.
- Slow progress in trade and exchange liberalisation characterises countries with low growth rates. Regional trade arrangements and agreements have encouraged progress in these areas, but the region still lags behind other developing regions in this regard.
- Restrictive or unbalanced structural policies and sectoral composition of output exacerbates poor performance. Countries, notably South Africa, Namibia and Botswana have moved forward in this regard with privatisation of parastatal industries, which has opened the economies to the effects of regional and global market forces. However, strong contributions to local development have possibly been diminished, in some specific cases (Iscor, South African Railways, Eskom), by a reduction in state control of the operations.

Table 3.3: *General state of economies in Southern Africa (1999) (data from IMF, 2001, SADC, 1999, and www.infoplease.com, all in RT5 Cawood).*

Country	GDP (US$m)	GDP (US$) / Capital	CPI (per cent)
Botswana	5,022	3,199	7
Mozambique	3,877	224	2
Namibia	3,272 (1998)	1,730	9
South Africa	130,167	3,024	5
Tanzania	8,066	246	8
Zambia	3,470 (1998)	344 (1998)	31 (1998)
Zimbabwe	5,633	431	58
SADC	157,902 (1998)	821 (1998)	77 (1998)
USA	$ 8.5 Trillion 1998	31,500 (1998)	1.6 (1998)

Table 3.4: *Gross Domestic Product (Real Growth Rates in SADC), 1997 2000 (IMF World Economic Outlook, SADC member States, both in RT5 Macfarlane).*

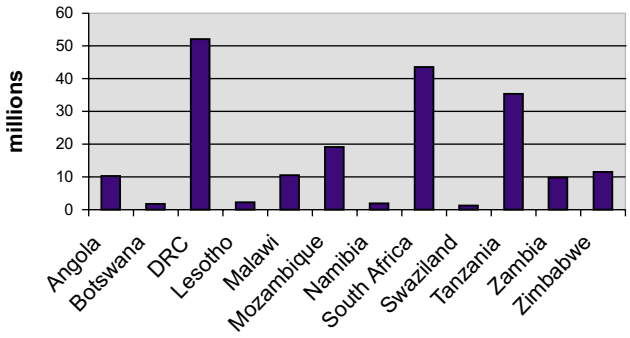
Country	1997	1998	1999	2000*
Angola	5.9	1.7	4	7
Botswana	6.9	8.3	4.2	6.5
DRC	-6.4	-3.5	-5	5
Lesotho	3.5	-5.8	2	4
Malawi	5.3	6.2	4.2	3
Mozambique	6	9.9	9	8
Namibia	2.4	2.6	2.4	2.5
South Africa	1.7	0.6	1.2	3.5
Swaziland	3.8	2.5	2	3
Tanzania	3.3	4	4.8	5.5
Zambia	3.5	-1.8	2	3.5
Zimbabwe	2	1.6	0.5	-3
SADC	2.2	0.9	1.4	3.5
Sub-Saharan Africa	3.9	2.7	2.2	4.2
Africa	3.1	3.1	2.2	3.4
Advanced Economies	3.2	2.2	3.2	4.2

* Preliminary

3.3.2 The role of the mining and minerals sector in the economy

Figure 3.2(a-e) shows the contribution of the mining sector to GDP, employment and foreign earnings (see also Section 2.3.1).

3.2a. Population



3.2b. Population Growth Rate

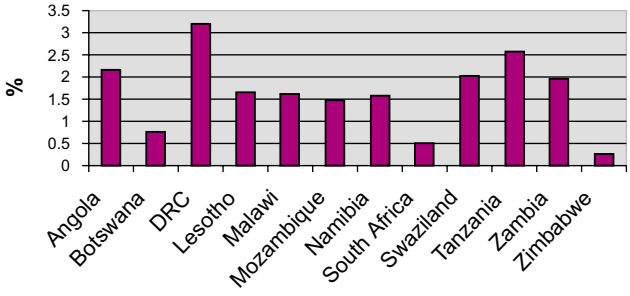
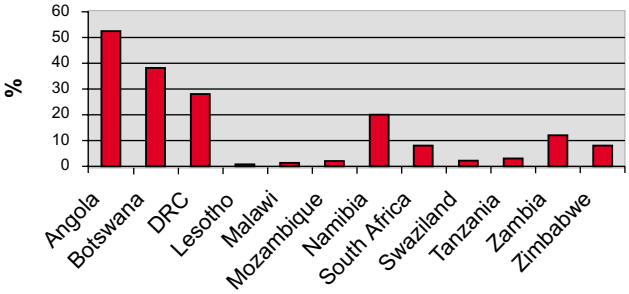


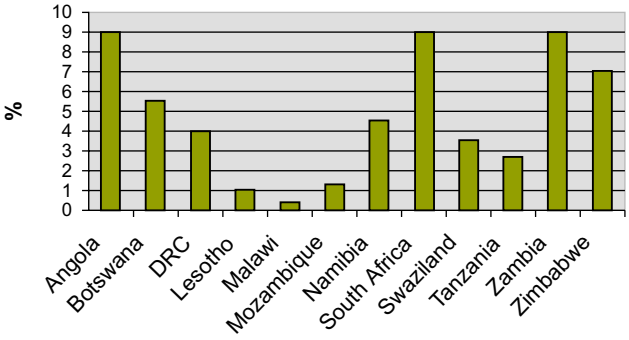
Figure 3.2 a e: *Summary data for the twelve mainland SADC states showing the relative importance of social and economic contributions made by the mining and minerals processing sector in each country (Hounsome & Ashton, 2001).*

3.2c. Mining Contribution to GDP



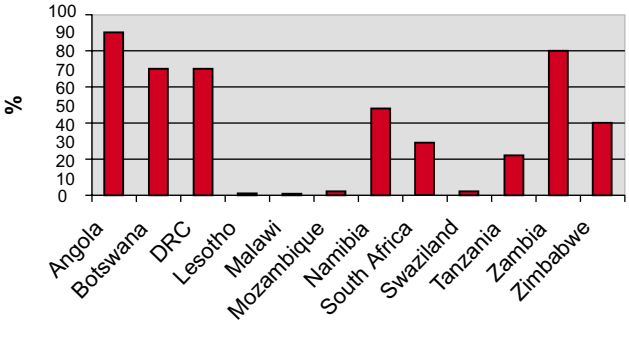
Mining contribution to GDP in 1999; includes onshore and offshore oil and gas plus diamonds, plus all other formal land-based mining activities.

3.2d. Mining Employment



Expressed as a percentage of total available adult workforce; excludes linked industries and small scale miners.

3.2e. Mining Share of Foreign Earnings



Share of total foreign exchange earnings in 1999 that are directly attributable to sales of minerals and mineral products; excludes allied industries and small scale miners.

The domestic market for most mineral commodities produced in the region is relatively small. Mining is orientated towards the export market, and demand depends on global trends. Economies are therefore vulnerable to fluctuations in international commodity prices (RT6 Granville). Although the volume of trade has increased, value has decreased, and is being added predominantly in trading countries that have invested capital in downstream value addition to commodities (RT5 MacFarlane). This is to the disadvantage of southern African states, as prices of most minerals have been declining on a long-term basis (RT6 Granville).

A lack of progress in downstream value addition to commodities typifies southern African countries (RT5 MacFarlane). The reason for this lack of progress is identified as business environments that are not conducive to investment in certain areas of minerals beneficiation. The role of government, in this regard, is to create an enabling environment for investment in beneficiation, as opposed to one of direct intervention. An example of such direct intervention is the South African Draft Minerals and Petroleum Resources Development Bill, which tends to prescribe investment in beneficiation rather than offering incentives such as tariff reduction and tax relief (RT5 MacFarlane).

Some positive growth trends are emerging, especially where there have been shifts away from reliance on resource-based economies[5]. However, most southern African countries still experience low investment and growth rates due to instability and conflict, investor-unfriendly policies and a lack of regional integration (RT5 MacFarlane).

Minerals are, by nature, a wasting asset. Once high-grade ores and shallow reserves have been depleted, an alternative source of exports has to be found in order to ensure that economic growth is sustained over the long-term. Rich and diverse mineral endowment can be a curse rather than a blessing for resource-based economies, primarily because it leads to a dependency on easy, once-and-for-all natural resource rents and discourages economic diversification, both within the mining sector as well as in other sectors (manufacturing and agriculture). It has been claimed that a current impediment to enhanced national and regional trade in the SADC region is the lack of an adequately diversified industrial base. Given that southern Africa has almost complete resource integrity, there is considerable opportunity for ensuring the sustainability of mining and mineral processing activities in the long-term by promoting diversification via economic linkages (Jourdan & Thomas, 2001; Walker, 2001).

The Zambian economy is dominated by the mining and minerals sector and is reliant on the export of one commodity. Little diversification has occurred, and the industrial base has remained small. South Africa is an example of how the mining and minerals sector has lead to diversification and economic growth. The country is a important exporter of minerals and manufactured goods and it has the most significant industrial base in the region. Certain factors indicate that the region has a competitive advantage for increased beneficiation. These are:

- resource endowment,
- energy,
- technology and research,
- labour availability,
- transport, and
- infrastructure and location.

(RT5 MacFarlane)

In spite of the general lack of progress in the region, there have been some important developments in beneficiation. These include:

- the establishment of the "compact" between Mintek and the South African Department of Minerals and Energy,
- the move by the Rand Refinery to produce semi-manufactured products aimed at the local jewellery market,
- the establishment of the second line at the Mozal smelter in Mozambique,
- 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, using aluminium from southern Africa,
- agreement on the necessary funding mechanism and structure for the appointment of a Gold Jewellery Transformation Champion to develop the gold jewellery manufacturing sector,
- the joint establishment of project "AuTEK" by 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 the Zincor zinc refinery.

(RT5 MacFarlane)

[5] A resource-based economy is defined as one with a contribution of resource based industries to GDP of more than 8 per cent.

The benefits of large-scale mining and minerals developments may extend beyond national boundaries. The establishment of the Mozal aluminium refinery near Maputo, for example, has stimulated the refurbishment of the city's harbour which, together with the development of the Maputo corridor has made the port a viable export node for South African goods. The purchase of South African electricity by Mozal has also benefited that country.

3.3.3 The growth of small scale mining as an economic activity

The debate around the definition of small scale mining is an ongoing one. Various definitions have been formulated, but no single one is satisfactory to all stakeholders or descriptive of all the variables of the small scale mining sector. Different criteria are used throughout the region (and throughout the world) to define the sector, but it is commonly associated with informal, unregulated, under-capitalised and under-equipped operations that lack technical and management skills (RT1 ITDG). It is in this general sense that the term 'small scale mining' is used in this report, although there are notable exceptions to these characteristics in the region.

Small scale mining is largely a poverty-driven activity, typically practiced in the poorest and most remote rural areas by a largely itinerant, poorly educated populace with few employment alternatives (RT1 ITDG). This activity is usually wasteful of non-renewable resources and hazardous to human and environmental health. However, it has the potential to economically empower disadvantaged groups and enrich nations by virtue of its low investment costs and short lag-time from discovery to production. The sector is also able to exploit marginal mineral deposits that are not economically viable for large mining companies (RT1 ITDG).

Where available, figures for numbers employed, production levels and potential contribution to national GDP, are estimates. This is due to the lack of a uniform definition of the sector, difficulties in accessing and verifying information and the secrecy that surrounds its "illegal" or informal component.

Small scale mining is a rapidly growing sector. In Figure 3.3, Svotwa and Sibanda (2000, in RT1 ITDG) project the expected growth in the number of small scale miners in Zimbabwe. According to these authors, small scale mining activities in that country will triple in the next ten years.

Small scale mining in other parts of southern Africa is also expected to grow, largely due to the continued under-performance of the economies in the region and the expectation that the formal sector will not be able to meet job creation demands.

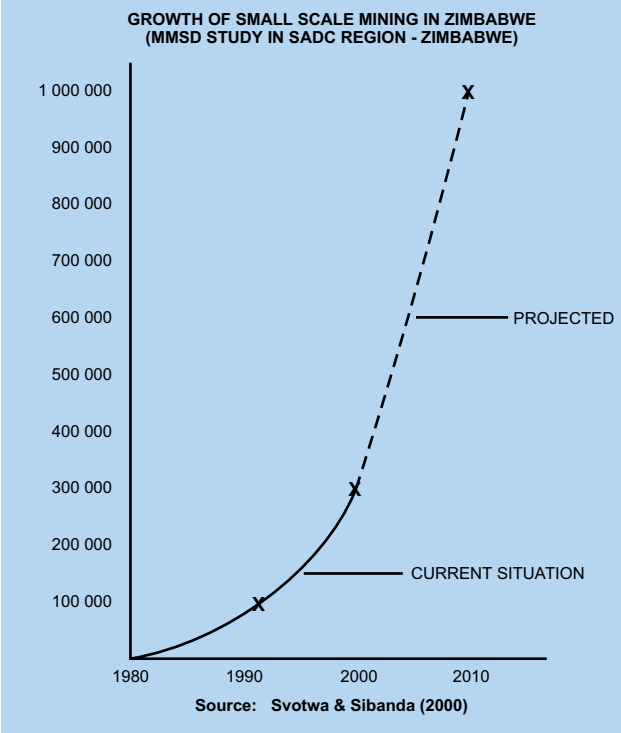


Figure 3.3: *Predicted growth in small scale mining in Zimbabwe (RT1 ITDG).*

3.3.4 The economic impact of HIV/AIDS

HIV/AIDS is a major threat to the development of the region as the largest percentage of victims are the productive members of society. The economic implications are dire: loss of productivity, the loss of benefits of education and training and the diversion of resources from investment to health, orphan care and funerals (Chanda, pers. comm. in RT2 Elias *et al.*). The frequent loss of both parents to AIDS has seen a rapid increase in the number of AIDS orphans throughout the region, many of whom have no alternative but to live off the street. It is estimated that in Kitwe, in the Zambian Copperbelt, there are more than 45,000 AIDS orphans (RT5 Kangwa).

The main constraint on treating HIV/AIDS in the southern African context is arguably the cost of treatment. Negotiations are underway between development agencies, national governments and pharmaceutical companies to provide drugs more cheaply to developing countries. However, even at dramatically reduced rates, the cost of drugs, and administering them, are unlikely to be less than US$ 1 per day. This is one-half of the region's daily per capita GDP and is beyond the reach of most public health budgets (RT2 Elias *et al.*).

A further major constraint is the lack of capacity and infrastructure to administer antiretroviral therapy adequately. This includes aspects such as secure dispensing facilities and personnel to undertake regular monitoring. Most southern African countries are not in a position to do this through their public health systems (RT2 Elias *et al.*).

An HIV/AIDS research report by ING Barings concluded that the mining sector will be the most affected component of the South African economy, followed closely by transportation and storage. The research predicts that about 27 per cent of mineworkers will die of AIDS in 2005 (Business Day, 28 December 1999, in RT2 Elias *et al.*).

As HIV prevalence increases, and morbidity and mortality rise, the mining sector will be faced with the economic, social and environmental costs of an infected workforce (RT2 Elias *et al.*). If HIV/AIDS is immediately factored into decision-making processes, the pandemic should not threaten sectoral viability in the future. However, there is no doubt that HIV/AIDS compromises the sustainability of operations with low margins, or those that are exploiting highly cyclic commodities (RT2 Elias *et al.*). HIV/AIDS therefore reduces the wealth that could otherwise have been realised for the benefit of the nation.

3.3.5 Current trends: privatisation and restructuring

Governments in the southern African region have failed to run nationalised mining operations profitably, or to retain international competitiveness. Consequently, many of southern Africa's mineral -rich regions are in economic decline (RT5 Kangwa). Under pressure from the World Bank and IMF Structural Adjustment Programmes, several southern African countries are currently grappling with the privatisation of state-owned enterprises, including mining sector companies.

Privatisation of national mining industries does not guarantee their survival nor that they will be able to contribute towards sustainable development. The recent announcement of Anglo American plc's withdrawal from the Copperbelt has cast doubt on the future of Zambia's copper industry.

Mergers, acquisitions and black empowerment initiatives have changed the face of the South African minerals industry. Declining prices have forced mines to become more efficient in order to survive. Restructuring has promoted the establishment of medium and small service and supply companies, a number of which are black-controlled. The Draft Minerals and Petroleum Resources Development Bill emphasises the participation of black empowerment companies in the industry through access to mineral rights, but access to finance remains a problem for these companies (South African Minerals Review 1998-1999 in RT5).

Similar pressures to restructure are also experienced in other southern African countries. The former Gold Fields group has sold its Tsumeb mine (Tsumeb Corporation Ltd) in Namibia to a small company, and government-owned Zambian copper mines are being privatised (RT6 Granville).

As long as privatisation results in improved efficiency with equitable distribution of benefits, this trend has the potential to increase the wealth base of nations and therefore to contribute to economic sustainability.

3.3.6 Labour concerns and issues

The mining sector is a major employer in most southern African countries (see Figure 3.2d). The inter-dependence of the regional economy has resulted in the supply of migrant labour (see Section 2.2.4) to meet the demand in South Africa, the industrial hub of the region (Davies & Head, 1995, in RT3 Kangwa). Migration is generally regarded as relevant to any discussion about future regional economic cooperation in southern Africa (Crush, 1999, in RT5 Kangwa).

In the mid-1990s, at a time of decreasing commodity prices, the South African economy gradually opened up to global competition. Industry emphasized productivity in order to withstand this competition and to maximize shareholder value. Unprofitable operations closed and industry increasingly applied cost-saving methods. These measures decreased mining production and resulted in extensive lay-offs, especially in the gold mining sector (RT6 Granville). 341,000 mineworkers, 43 per cent of the South African mining industry's work force, lost their jobs between 1990 and 1999 due to liberalisation and decreasing commodity prices. The multiplier effect for workers and their dependants is variously estimated at between four and ten for that country and therefore more than one million people, and possibly up to three and a half million, lost their livelihoods (RT6 Granville; Baxter, pers. comm., 2001). The effect of this scaling down of gold operations also affected other sectors such as service industries and those businesses reliant on the spending power of mine workers.

3.4 Social context

3.4.1 Regional poverty

Table 3.5 compares the development metrics in the region with those of two developed countries. These metrics are also compared with regional and global figures.

Southern Africa is one of the least developed regions in the world. This is part of the context in which the mining and minerals industry operates, and therefore poverty alleviation, job creation and capacity building are critical focal areas for the sector in its transition to sustainable development. It is useful to compare Table 3.5 with Table 2.1. Such a comparison highlights the disparity between the mineral wealth of the region and the development benefits which accrue to its populations.

A local mother draws water from one of the hand-operated borehole pumps sunk for the local Mbonambi community by Richards Bay Minerals, South Africa (courtesy of Richards Bay Minerals)

Table 3.5: *The developmental state of the region (adapted from 2001 World Development Indicators, World Bank, 2001).*

	Percentage population under $2 per day	Illiteracy rate 1999 - Male %	Illiteracy rate 1999 - Female %	Access to an improved water source[1] 2000 - % of population	Under-five mortality rate 1999 per 1000	Life Expectancy at birth 1999	Physicians per 1000 people 1990-1998[2]
Angola				38	208	47	0.0[3]
Botswana	61.4	26	21		95	39	0.2
DRC		28	51	45		46	0.1
Lesotho	65.7	28	7	91	141	45	0.1
Malawi		26	55	57	227	39	0.0[3]
Mozambique	78.4	41	72	60	203	43	0.0[3 (1980)]
Namibia	55.8	18	20	77	108	50	0.2
South Africa	35.8	14	16	86	76	48	0.6
Swaziland							
Tanzania	59.7	16	34	54	152	45	0.0[3]
Zambia	87.4	15	30	64	187	38	0.1
Zimbabwe	64.2	8	16	85	118	40	0.1
For comparison Australia	0.0	0[4]	0[4]	100	5	79	0.8

[1]= 20 litres per person per day at least one kilometer from dwelling; [2] = Data for the most recent years available;
[3] = less than 0.05; [4] = less than 0.5

3.4.2 The HIV/AIDS pandemic

Africa in general, and eastern and southern Africa in particular, has the highest HIV prevalence and AIDS-related deaths globally (RT2 Elias *et al.*). Sub-Saharan Africa, with only 10 per cent of the world's population, accounts for 83 per cent of all deaths since the epidemic began. 25 per cent of those who have died are children (RT2 Elias *et al.*). No country, sector or individual is unaffected, and certain groups, especially children and the elderly living in AIDS-affected households, are vulnerable to the socio-economic impacts of HIV/AIDS. Predictions are that the epidemic will worsen in almost all southern African countries (RT2 Elias *et al.*).

HIV/AIDS is at its worst in the southern African countries (RT2 Elias *et al.*):

- more than one in five adults is HIV-positive in Botswana, Lesotho, Namibia, South Africa, Swaziland, Zambia and Zimbabwe,
- Botswana has the world's highest adult prevalence (35.8 per cent),
- South Africa is the nation with the largest HIV-positive population (4.2 million) and the highest rate, globally, of new infections, and
- without preventative therapy, approximately 30 per cent of babies born in the region will be HIV-positive and will die by the age of eight.

Richards Bay Minerals has implemented a community HIV/AIDS programme in partnership with the NGO Dramaiade. The programme is aimed at Grade 7 pupils in local RBM supported rural schools (courtesy of Richards Bay Minerals)

Based on figures in the most highly affected countries, Botswana, Swaziland and Zimbabwe, it is likely that at least 25 - 35 per cent of the entire adult population of southern Africa will eventually become infected. In some countries, prevalence may well reach 40 - 50 per cent (RT2 Elias *et al.*).

The ability of the mining and minerals sector to influence the pandemic in the short or medium term is limited. HIV prevalence is very high in communities associated with the mining and minerals sector, but it is also very high, sometimes equally high, in other sectors. The mining and minerals sector contributes to the spread of HIV by creating or exacerbating many of the risk factors, such as single-sex hostels and migrancy (see Section 4.3). It also provides employment and stimulates economic growth, and so minimises some crucial risk factors, such as poverty. However, increased economic development, for a period of time, helps to propagate the epidemic by increased mobility, access to alcohol, sexual exploitation, and sex work potential (Evian, 2001). Sexual contact is likely to remain the main mode of transmission in the region. The risk of occupational exposure in the mining sector will rise as prevalence within the workforce increases (RT2 Elias *et al.*).

The high prevalence rate is linked to the circulatory migration of the labour force. Migration has also been identified as a significant risk factor in the transmission of HIV in other parts of the world (Decosas & Adrien, 1997, in RT1 ITDG). This is particularly important in South Africa where more than 80 per cent of the South African mining industry's black employees are migrants. Many live in single-sex hostels and visit their rural families only occasionally (Crush, 1995, in RT1 ITDG). However, this situation is changing, and many mining companies are providing family housing units.

The HIV/AIDS epidemic occurs within a context of declining living standards across the region. Health services have been severely affected by economic decline and structural adjustment programmes. Acute shortages of essential drugs are increasingly common, and more and more hospital beds have to be set aside for AIDS patients (RT2 Elias *et al.*). The mining and minerals industry has been a key player in the fight against HIV/AIDS, providing a substantial proportion (and sometimes almost all) of the initiative and effort in the region (RT2 Elias *et al.*).

3.4.3 Gender equity

While reliable statistics for women's poverty in the region are not available, the UN Regional Human Development Report for SADC argues that women suffer from disproportionate levels of poverty - the feminisation of poverty (UNDP, 2000, in RT3 Ranchod). (See Section 4.4.4)

In South Africa less than three per cent of the formal mining sector workforce is female (NUM 1998, in RT3 Ranchod). Employment data for other countries in the region are not readily available.

In the southern African mining industry, the gender roles of men and women are traditional. Women employed in the sector largely carry out work traditionally seen as women's work - clerical, human resources, catering and other support services. Moving from such traditional and relatively static gender roles to an environment where women and men are regarded as of equal worth and dignity requires a significant shift in traditional gender patterns for both sexes (RT3 Ranchod).

The SADC Women in Mining Trust was established in 1996 with the support of the United Nations Development Fund for Women. Its aim is to consider the needs, problems and constraints faced by women in mining, and to ensure greater participation of women in decision-making and planning processes (Kaingu, 1999, in RT3 Ranchod).

The current SADC mining protocol (1997-2001) does not make any mention of gender issues (SADC Mining Protocol, 1997, in RT3 Ranchod). According to its programme of activities, the SADC Women in Mining Trust serves as a key link between women engaged in the mining sector (largely small scale and junior miners) and governments in the region (RT3 Ranchod).

The mining industry has shaped the lives of women in rural southern Africa for many generations. The important role women play in the rural economy, while the men leave to work on the mines, is a key feature of the mining industry (RT3 Ranchod).

Many mining communities have progressed from the single sex hostels, previously characteristic of the industry, to family dwelling units. Increasingly women form part of these communities, usually as spouses or children of mineworkers, but occasionally also as

Women miners at Gold Field's Beatrix Gold Mine, South Africa (M. Beck)

mineworkers or sex workers (RT3 Musvoto). However, opportunities for women in these communities, whether to access credit, enter employment or participate in decision-making processes, are generally limited.

3.4.4 Retrenchments and reduced demands for migrant labour

As a result of the incomes lost through a reduction in the demand for labour, levels of poverty are likely to increase in families and communities that once specialised in exporting male labour. Social stress will also increase in the rural households as they struggle to accommodate the repatriated workers (Chirwa, 1997, in RT5 Kangwa).

Positive results have been achieved by multistakeholder initiatives that aim to reduce the impact of retrenchment on communities, especially in labour sending areas. At Western Areas Gold Mine in South Africa, Placer Dome, The Employment Bureau of Africa (TEBA), the Mine Workers Development Agency and the Canadian International Development Agency, among others, have initiated a project to promote economic livelihoods amongst retrenched miners in their home villages (Kapelus, pers. comm., 2001).

3.4.5 Local development and social management

A number of mines or mining companies contribute to adjacent communities by investing in community development projects. These activities have benefits for both the mine and the community: they contribute economic benefit to the area concerned, improve the general morale, foster good community relations and promote a stable workforce. However, in some instances economic benefits may accrue to a small part of the population and create "islands of development" (Kapelus, 2001, in RT6 Granville) which do not contribute to the sustainability of the community.

Such sustainability is further at risk if sufficient support networks and management systems alternate to those of the mine, are not put in place well before the mine closes (Kapelus, pers. comm., 2001).

One strategy for local economic development focuses on the diversification of local economies by encouraging the growth of a diversified small business sector that can be sustained after mine closure. In South Africa, the Mineworkers Development Agency (MDA), the job creation wing of the National Union of Mineworkers, provides a range of enterprise support services to local communities. 72 per cent of those trained by MDA over the last three years have a direct link to the mining industry, either as ex-miners or their dependants. Ten thousand people have already been trained by the MDA. As the demand for migrant labour decreases, this training is critical in the rural areas, from where most migrant labour comes (Phillips, pers. comm., 2001).

In the Copperbelt, recently privatised mines are setting up systems for outsourcing of services. This encourages local entrepreneurs, many of whom are former mine employees, to establish companies to provide services such as materials supply and catering (RT3 Kangwa). Outsourcing is an important instrument to promote local economic development (RT3 Choshi).

Mine closure, and its effects on local development, are crucial issues for the affected community. Social plans present an opportunity for forging public-private partnerships in addressing post-closure issues. The concept of a social plan is relatively new in the southern African region, and South Africa is regarded as the pioneer in this respect (RT3 Choshi).

Richards Bay Minerals finances and supports this cookery group as part of its Community Development Programme (courtesy of Richards Bay Minerals)

3.5 Environmental context

3.5.1 Mining and the environment

Diversity of species and individuals is a key characteristic of natural ecosystems. These, in turn, form the basis of all ecosystem goods and services upon which sustainable livelihoods and food security depend (Tewary *et al.*, 1996). Historically, the mining sector has not recognised this, and mining activities have often resulted in destruction of, or radical alterations to, whole ecosystems. In such cases, full recovery of these ecosystems and their components may take many years, possibly even millennia (Cooke, 1999). Consequently the impacts on the biophysical environment caused by the mining and minerals processing industry have frequently been accompanied by a significant loss of biodiversity. Current best practice attempts to avoid negative impacts and, where necessary, to restore impacted environments. This is an essential step if the sector is to contribute significantly towards sustainable development in the region.

Historically, as many as half a million hectares of land per year have been directly disturbed by mining across the globe (Young, 1992, in Johnson & Lewis, 1995). While individual mine sites may directly affect large areas, the indirect and cumulative impacts associated with many sites can affect entire regions (Cooke, 1999). Associated activities such as power generation, transportation systems and subsidiary industries can add to these impacts. The area or "physical footprint" occupied by mine infrastructure is small in comparison to other land uses such as agriculture, but mining-related impacts are usually more intense, and may affect much larger areas due to the dispersal of pollutants through rivers, the atmosphere and along transport routes spanning hundreds of kilometres.

3.5.2 The impacts of mining and minerals processing on the environment

There are numerous opportunities for metals and other substances to be released into the environment throughout the mining and mineral beneficiation process. Metals, salts and fibres may be released into the aquatic environment as solutions, colloids and suspended solids, or to the atmosphere in the form of gases, fumes and aerosols from smelter stacks. Metals are also transferred into the environment via fugitive dusts from tailings and ore stockpiles. Once in the environment, most metals move along natural biogeochemical pathways to reach sinks including sediments, soils and biota (Davies, 1987). Water is a key vector in the transport and transformation of these metals. Commonly the dominant force in a landscape, water dissolves and erodes material from exposed surfaces and transports it along surface watercourses and underground flow paths.

Healthy Miombo woodland, near Chingola, Zambia (D. Limpitlaw)

Deforested Miombo woodland, near Kitwe, Zambia (D. Limpitlaw)

3.5.3 Mining and the environment in southern Africa

Rapidly expanding populations in the developing world place increasing demands on finite biophysical resources. Inevitably, this results in increasingly widespread habitat destruction (Tewary *et al*., 1996), which is exacerbated by the need for industrial development and short-term economic benefits. In the SADC region, the mining industry has been cited as the largest polluter (Sweta, 1994). The critically important role played by mining in the GDP of countries in the region, and the fact that many SADC governments have limited capacity to monitor and control mining operations, magnify these impacts.

Activities associated with mining impact widely on the environment. These impacts include: alteration or destruction of the natural land surface and soil structure, pollution of air, soil and surface and sub-surface water, as well as disturbance of vegetation and wildlife. Examples of such impacts include: toxic serpentinite dumps from chromite and asbestos mining in South Africa, Swaziland and Zimbabwe, the spontaneous combustion of coal in Zambia, Zimbabwe and South Africa and diamond rubble dumps in Angola, South Africa, Swaziland, Botswana and Namibia. Water quality may be affected by naturally occurring acids drained from mines and waste piles in Swaziland, Botswana, Zambia, Zimbabwe and South Africa. Air quality is affected by sulphur dioxide, as well as other gases, fumes and particulate substances emitted from smelters and refineries.

By the end of the last century, mine residue deposits in the Zambian Copperbelt covered more than 8,000 ha, mine excavations extended over more than 900 ha while the area covered by natural woodland had almost halved in the thirty years since 1970 (Limpitlaw, 2001).

The section below describes some of the more significant environmental impacts arising from mining and minerals processing in southern Africa.

3.5.4 Mineral processing

Many of the gold ores in Zimbabwe are associated with naturally occurring arsenic that is released into the environment during roasting of the ores. In the last decade, two gold roasters in Zimbabwe are estimated to have emitted 40 tonnes of arsenic

Burning discard - Witbank, South Africa (courtesy of M. Viljoen)

daily (Booth *et al.*, 1994). Zimbabwean gold leaching processes use approximately 1,500 tonnes of sodium cyanide and 5,000 tonnes of calcium cyanide annually (Sweta, 1994). Cyanide is also used in the recovery of copper (as a floatation depressant) in the Zambian Copperbelt. Some of this cyanide inevitably finds its way into mine waste deposits.

In Zambia, the natural vegetation downwind of the now closed Kabwe lead/zinc smelter has been damaged extensively by air pollution. Copper smelters in the Zambian Copperbelt emit more than 200,000 tonnes of sulphur dioxide and hundreds of tonnes of dust containing trace metals such as lead, zinc and copper annually (Booth *et al.*, 1994). An unusually large number of Zambian children suffer from lung diseases, largely due to air pollution from copper smelters (Booth *et al.*, 1994).

Atmospheric pollution is removed from the air by rainfall and through dry deposition and results in soil contamination. Consequently, concentrations of many contaminants build up in the soils near smelters, and some find their way into food crops grown in nearby agricultural areas.

The Kabwe lead/zinc smelter(now closed) in Zambia (D. Limpitlaw)

Zambia and Copper

Zambia is an example of extreme over-dependence on the production and export of a single product (Bomani, 1996). The urban community, shaped by the requirements of the copper industry for labour, is a characteristic of the country. Zambia's dependence on copper has been exacerbated by its inability to influence world prices for the metal. The country's drive to earn foreign exchange through copper has resulted in environmental degradation through air and water pollution by smelters. Those nearest the smelters, often miners and their families, are the most vulnerable to the pollution caused by the operations.

3.5.5 Small scale mining

Handgot mines and gold panning result in soil erosion, siltation and alteration of river courses. This problem can be very significant in intensively worked locations: in the mid 1990s, an estimated 2,000 small scale miners were working 187 pits at Msugu in Tanzania (Sweta, 1994). Zimbabwe experiences major siltation as a result of gold panning activities, particularly along the Mazowe River. Vegetation and soil have been stripped for up to one kilometre from the riverbed in some instances. The extensive use of mercury in small scale gold workings, both in Tanzania and other SADC countries to the south, results in contamination of river sediments.

Gold panning in Zimbabwe. Tortoise shells serve as hard hats (M. Viljoen)

3.5.6 Subsidence and disturbed land

All subsurface mining results in the transfer of material from beneath the surface to the surface itself. Abstraction of groundwater is often required for reasons of improved access and miner safety. Removal of rock and subsurface water frequently results in surface subsidence and collapse, as has occurred at Mufulira in Zambia.

Subsidence alters both surface and underground drainage patterns, and results in the alteration or degradation of the land surface. Water often flows into and accumulates within subsurface voids left by mining operations.

There are more than 4,000 unprotected mine openings in Zimbabwe. These represent localized zones of land degradation, as well as a significant safety hazard (Sweta, 1994).

3.5.7 Impacts associated with specific commodities

Coal

Coal is mined in several countries in the region. Colliery residues are carbonaceous and usually contain pyrite. On contact with water, coal seams, surrounding carbonaceous rock and pyrite can be acid generating. Water draining from collieries is often highly acidic and laden with heavy metals. This acid mine drainage (AMD) may persist for many hundreds of years after mine closure. Water is not the only medium to be affected by coal mining. Both

Sinkhole west of Western Areas Gold Mine, South Africa (courtesy of M. Viljoen)

carbon and pyrite are subject to oxidation on exposure to air and the oxidation process is accompanied by the generation of heat. Oxidation proceeds slowly at ambient temperatures, but accelerates if the temperature increases as heat is generated (CMSA, 1995). Coalfields in Botswana, Malawi, South Africa, Tanzania, Zambia and Zimbabwe are located under highly reactive sedimentary rocks which, together with coal, can spontaneously ignite on exposure to the atmosphere.
Combustion produces smoke and noxious gases (SO_x, CO_2 and CO). Localised acid rain occurs when rain washes these gases from the air. Water pollutants arise directly from the oxidation and combustion of pyrite in the residue, and include sulphates.
Discard and undersize (fines) dumps can burn for many years and may be very difficult to extinguish, as at Maamba colliery in Zambia (Booth *et al.*, 1994).

Gold

Gold extraction from low-grade ore bodies using complex metallurgical processes requires the construction of very large residue deposits on the surface. Pyrites and arsenopyrites must be oxidised to release gold, and this process can produce sulphur dioxide, sulphuric acid and arsenic trioxide, depending on the technology applied. Cyanide is an important reagent in gold processing and can have severe impacts on the environment before it is broken down to inert components.

Asbestos

Asbestos mine dumps, particularly those containing blue asbestos, are a particular health hazard in Zimbabwe, Swaziland and South Africa (Booth *et al*., 1994). A recent landmark ruling in the UK has resulted in an out-of-court settlement whereby a British-registered company will pay compensation to communities affected by asbestos dumps created by the company's operations in South Africa more than twenty years ago.

Chromite mining

Residue deposits generated as a result of chromite beneficiation in the production of ferrochrome pose a threat to the environment due to the possibility of leaching hexavalent chrome from these deposits and contaminating water supplies.

3.5.8 Water in southern Africa

The southern African region is rich in natural resources including minerals. However, future regional growth and development may be constrained by the increasing scarcity of one of the most critical resources - fresh water.

In comparison to the rest of the world, the distribution of freshwater resources in Africa is extremely variable (RT4 Ashton *et al.*). The southern portions of Africa receive considerably less rainfall than their equatorial neighbours. These drier areas also experience greater variability in year-to-year rainfall, and generally have more extreme air temperatures and higher rates of evaporation. Together these features reduce surface water flows in rivers and streams, and provide little recharge to ground water (RT4 Ashton *et al.*).

In addition to climatic variability, a significant proportion of the continent's water resources comprise large river basins or underground aquifers that are shared between several countries (RT4 Ashton *et al.*). Consequently, countries have to compete directly or indirectly to derive the maximum possible benefits from the available water resources (RT4 Ashton *et al.*).

In virtually every African country, populations have grown dramatically during the past century. This growth has been accompanied by an equally dramatic increase in the per capita demand for water. Several southern African countries have already reached or passed the point considered by Falkenmark (1989, in RT4 Ashton *et al.*) to indicate severe water stress or water deficit, where the scarcity of water supplies effectively limits further development. Coupled to the reduction in the per capita availability of water is an escalating trend in the degradation of water quality (RT4 Ashton *et al.*).

Water management challenges in the region are both significant and varied. These challenges include the desalination of seawater in Namibia, flood prevention in Mozambique and pollution control in Zambia. Water availability is key for sustainable development in the region, and stakeholders in the mining and minerals sector have therefore accorded this aspect of the biophysical environment the greatest prominence (MMSD Mulitstakeholder Meeting, Johannesburg, November, 2000).

The Kafue River near Kitwe, the most polluted river in Zambia, supplies drinking water to over 40 % of the population (D. Limpitlaw)

Water Pollution

Water pollution caused by mining activities is a significant problem in several countries in the SADC region. In Tanzania, for example, 78% of water samples analysed in the Lake Victoria Goldfields contained mercury in concentrations significantly above the drinking water standard of 1 g/l (Mpendazoe, 1996). The presence of heavy metals in rivers and river sediments in small scale mining areas in Tanzania is a threat to both the environment and to human health.

Many minerals are chemically stable at depth, but decompose rapidly once exposed to oxygen and water. In most coal and gold mines in southern Africa, for example, significant quantities of pyrite (FeS_2) occur in the mineral deposits. When this pyrite is exposed to atmospheric conditions, acidity is produced, with consequences for water quality. Ore and waste stockpiles established on surface commonly contain significant amounts of pyrite and, with the passage of time, heavy metals, sulphates and other pollutants are dissolved and leached out by precipitation. Bacteria accelerate the acid forming reactions by orders of magnitude, facilitating acid production for decades after mine closure. Often tailings deposits are located near streams and community water sources and are a continuing source of contamination. The impact of mineral pollution on an ecosystem may be severe and may result in a total absence of animal life from the receiving waters.

3.6 Conclusion

The operating context for the mining and minerals sector in southern Africa is a daunting one. The region has abundant mineral resources, but limited food production potential and water availability. Severe poverty, poor governance and social inequities prevail, and currently pose immense challenges for sustainable development. Mining and minerals processing provides a unique opportunity for developing the human capital of the region and ensuring economic stability. Such developments have an ecological price, and the wealth generated must be used, not only to bolster economic and social systems, but also to minimise environmental damage.

4. RECOMMENDATIONS AS TO HOW THE MINING AND MINERALS SECTOR IN SOUTHERN AFRICA CAN BEST CONTRIBUTE TOWARDS THE REGIONAL TRANSITION TO SUSTAINABLE DEVELOPMENT.

MMSD SOUTHERN AFRICA'S research and stakeholder engagement programmes identified a wide range of recommendations for ways in which the mining and minerals sector can contribute to the transition to sustainable development in the region. These recommendations have been made within the context of the goals for sustainable development in the southern African region, reflected in Figure 4.1.

The area of convergence in the centre of the figure represents the state of sustainable development. When social, economic and environmental concerns are equitably addressed, convergence occurs. The key challenge for the mining and minerals sector in southern Africa is to expand this area of convergence.

In addition to the above goals, the selection of recommendations was guided by:

- the generic framework derived for MMSD outcomes (see Table 5.1),
- regional priorities, and
- criteria set by MMSD SOUTHERN AFRICA.

4.1 Regional priorities

The recommendations set out in this chapter are not intended to be read as a manual, but as guidelines for the implementation bodies, who will need to expand them into detailed action plans.

Stakeholders prioritised certain over-arching issues that have to be addressed if progress towards sustainable development is to be achieved. These priorities appear as crosscutting issues in the recommendations. The critical issues in the region are:

- poverty alleviation,
- capacity building and skills training,
- gender equity,
- job creation, and
- governance.

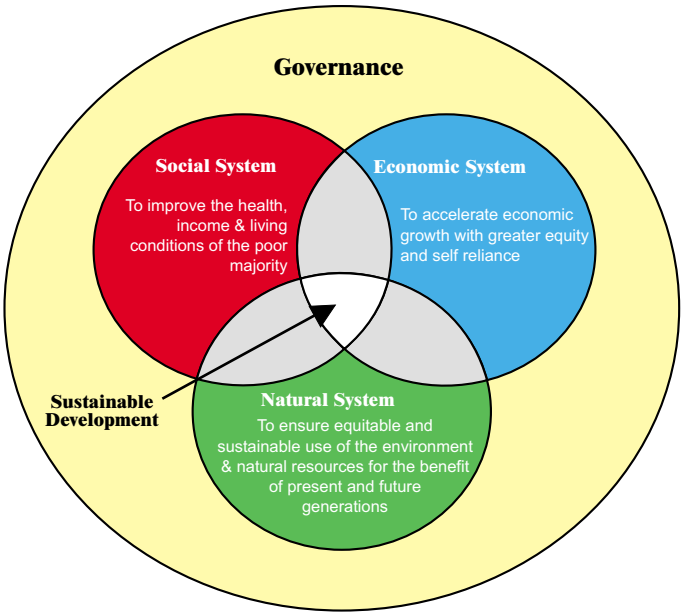


Figure 4.1: *Sustainable Development (based on the SADC vision for sustainable development in the region).*

4.1.1 Criteria set by MMSD SOUTHERN AFRICA

Criteria for making recommendations and proposing implementation structures were identified by the MMSD SOUTHERN AFRICA Steering Committee, in collaboration with stakeholders.

CRITERIA FOR MAKING RECOMMENDATIONS AND PROPOSING IMPLEMENTATION STRUCTURES

Recommendations were made on the basis of whether they:
- are implementable and cost-effective,
- address regional issues,
- would make the most significant change,
- are transferable across the range of sustainable development principles,
- promote multi-stakeholder partnerships and,
- are acceptable to key stakeholders.

The mining and minerals sector comprises a number of stakeholders. These include: academia, CBOs, consumers, government, industry, industry associations, labour, NGOs and small scale miners. Some of the recommendations identified by MMSD SOUTHERN AFRICA apply to only one stakeholder group, but, because of the concerted effort required to enable the mining and minerals sector to contribute to the transition to sustainable development, many of the recommendations will require co-operation between groups.

The following sections identify key issues, elaborate on them and highlight the key recommendations to address these issues. The issues have not been prioritised by MMSD SOUTHERN AFRICA, but follow the same order as that of the research reports.

Figure 4.2 provides a key to classification of the recommendations that follow.

				
Social system	**Economic system**	**Biophysical system**	**Governance**	**All spheres of sustainable development**
P	**C**	**G**	**J**	
Poverty alleviation	**Capacity building and skills training**	**Gender equity**	**Job creation**	

Figure 4.2: *Key for classification of recommendations. The symbols, or a combination of them, link the recommendations presented in the text to relevant spheres of sustainable development as presented in Figure 4.1. The overarching issues addressed by the recommendations are identified by one or more letters. One overarching issue, governance, is also a component of Figure 4.1 and is therefore not represented by a letter but by the encompassing yellow circle.*

4.2 Small scale mining

The sub-sector employs an estimated 1.5 million people, and several million more benefit directly or indirectly from its activities (RT1 ITDG). Its size and nature mean that it has the potential to contribute to sustainable development in terms of livelihoods, employment and contribution to GNP. Small scale miners are highly mobile, can mine areas which are not viable for large-scale mining companies and are active in more than one sector of the economy, e.g. agriculture and mining. They also benefit the local communities by creating a demand for goods, such as food, and services.

However, current practices make the activities of the small scale mining sector unsustainable. The sector is expected to grow rapidly, (see Section 3.3.3) and there is an urgent need to assist small scale miners to align themselves with the principles of sustainable development, as small scale operations are a threat to social, economic and biophysical systems in the region.

Recommendation 1 : small scale miners recognise their role in the economies of the region and commit themselves to co-operation with the other stakeholders in the sector to align small scale mining activities with the principles of sustainable development.

4.2.1 Inadequate national governance frameworks for small scale mining

The extreme mobility of small scale miners, the quasi-clandestine nature of their operations and the remote areas in which they carry out their activities make a census of the sector extremely difficult. Their activities are difficult to control and monitor, and accurate and up-to-date data is impossible to obtain. The difficulty of controlling the sub-sector, and tapping its economic potential, is increased by insufficient capacity to implement a legal or fiscal framework for small scale miners (RT1 ITDG). Currently the sub-sector is not an attractive investment proposition. Government commitment would make it more attractive for companies, NGOs, and donors to invest in the sub-sector, both financially and by skills training.

The small scale mining sub-sector can currently offer little security, such as security of tenure, to access funding. Small scale mining presents a high risk to investors as frequently no geological assessment of deposits has been undertaken.

Because of the unregulated nature of small scale mining activities, it is difficult to monitor them in any way - health and safety, environmental impact and contribution to national economies. A lack of monitoring results in continued unsustainable practices and a failure to consider and use alternative technologies.

As they operate largely outside a legal framework, small scale miners do not pay taxes and are not accountable for compliance with environmental legislation. On the other hand, they cannot benefit from any existing social security system (Hentschel *et al.* 2001).

Formalisation and legalisation will enable governments to collect revenue from the sub-sector. This revenue can be used to fund the upgrading of the sub-sector as envisaged in Recommendations 5 and 6. The benefits envisaged in Recommendations 2 and 4 should be clear to small scale miners, and the administrative procedures required from them to enter the formal sector should be simplified.

Recommendation 2: national governments support the transition of small scale mining to the formal sector through the implementation of policies specifically geared to this sub-sector.

4.2.2 Inadequate regional co-ordination of small scale mining activities

Small scale mining is a regional phenomenon, and the sub-sector is active in every country in the region. These countries are at different stages of policy development. Some have legislation in place to regulate the sub-sector, whilst in others governments have historically tended to ignore it. Tanzania and South Africa have recently formulated policies that recognise the sector and attempt to provide an enabling framework (Hentschel *et al.* 2001).

Because of the nature of their activities, small scale miners tend to migrate across borders, sometimes in their thousands. Their activities do not contribute to regional development and co-operation, and can lead to clashes with local small scale miners and indigenous communities. It also leads to the exploitation of the migrants, as the local authorities charge them a tax to get 'legal' status (RT1 ITDG).

Recommendation 3: SADC creates a forum to promote the development of a harmonised regional legal framework to enable the activities of small scale miners to be conducted in an orderly and systematic manner.

4.2.3 Lack of associations for small scale miners

There is a lack of associations for small scale miners, and where these do exist, they are frequently handicapped by poor leadership, a lack of planning and management skills, poor communication with their members and a lack of alternative sources of funding for their activities (RT1 ITDG). A small scale miner acting alone, or in a small group, has little bargaining power to access finance and is also disadvantaged in negotiations with minerals buyers. The individual operator finds it difficult to access training and skills development opportunities, and has little or no opportunity to participate in information exchange (RT1 ITDG).

Recommendation 4: appropriate stakeholders (e.g. donors, Chambers of Mines, NGOs, small scale miners, industry, governments and labour) encourage, facilitate and support the formation of small scale mining associations and co-operatives.

C

4.2.4 Lack of business management skills

Lack of basic knowledge of how to manage an enterprise is a major hindrance to sustainable growth of small scale mining operations, even if natural resources are promising and production is reasonable (RT1 ITDG). The sub-sector operates outside any regulatory framework, and this encourages the adoption of casual business methods. Market research is frequently ignored, and this, together with ignorance of the laws applying to business operations, makes miners vulnerable to exploitation, particularly by the buyers of their minerals.

A lack of business skills means that many miners are unable to approach finance institutions with a bankable document containing a sound business plan and evidence of financial management skills. Other factors make it almost impossible to raise working capital. There is a lack of trust and accountability in the sub-sector, and small scale miners are highly mobile, abandoning one site and occupying another virtually overnight.

Existing facilities for small scale miners to access loans, grants and credit all have serious drawbacks. The miners are in a weak bargaining position with regard to loans from buyers of their products, and the requirements for loans from institutions are frequently too complex and strict for the ordinary miner. Often the administrative and management costs associated with disbursement of the loans or grants are much higher than the capital provided (RT1 ITDG).

It has proved difficult to set up sustainable revolving loan schemes, or to establish the use of third party guarantees that would enable

other institutions to assist miners to get loans. Financial institutions and programmes are not geared to the specific requirements of the small scale mining sub-sector.

Recommendation 5: education institutions, in partnership with companies and government, develop and offer appropriate training programmes for comprehensive business skills acquisition by small scale miners; and financial institutions (banks, development agencies), government, companies and NGOs facilitate access to credit adapted to the specific requirements of small scale miners.

C J P

Many small scale mining operations rely on manual labour, which is not only economically inefficient but also dangerous. Miners frequently burrow into the hanging, and the resultant collapse of the tunnels causes injury or death. Other examples of poor technology include the sinking of underground shafts without adequate ventilation or support (RT1 ITDG).

Small scale miners usually work in rural areas, beyond the reach of postal, telephonic and electronic communication. It is difficult, even impossible, for them to access the information that is available and that would assist them to carry out their activities in a more sustainable manner and widen their technology choices. These miners have basic technical skills and geological experience but need training in and regular updating on appropriate technology. A lack, for example, of appropriate minerals processing technology limits their ability to match market demand and optimise profits.

Lack of geological information leads to unsystematic exploration. Information on the potential of a deposit, and its suitability for small scale mining, are essential for successful exploration. Currently the approach to exploration is unsystematic and wasteful of time and money (RT1 ITDG).

Inadequate and inappropriate technology inflicts severe environmental damage, including water contamination, siltation and the destruction of the landscape by alluvial mining. Many of the beneficiation techniques applied pose significant environmental and human health risks. Little effort is being made to minimize these risks (RT4 Ashton *et al.*).

Appropriate technology for small scale mining has been identified in a number of cases, but the promotion and dissemination of this technology is not effective (RT1 ITDG). Information on improving health and safety conditions is also not freely available.

Minerals processing is a stage in the mining cycle where high human health impacts occur and environmental damage is likely. This is the area where technology skills are most needed in small scale mining. There is a need for raising awareness about the negative social and environmental impacts of their operations, and training in the skills of avoiding such impacts.

Case Study: The use of mercury in small scale mining in Mozambique

In Manica and part of Niassa provinces, the use of mercury in the amalgamation process for recovering very fine gold is common. Gold amalgamation consists of mixing the pre-concentrate of gold with mercury to obtain an amalgam, which is then heated in the open air, and the gold is recovered. Mercury, a highly toxic heavy metal, has the capacity to collect microscopic gold particles to form Au-Hg amalgam. In the process of amalgamation, part of the mercury is released directly into the river system, part of it inhaled by the processor, as no masks are used, and part of the mercury is released into the atmosphere. Gold amalgamation is often done near a river and in open places (RT1 ITDG).

Recommendation 6: education institutions, in partnership with government, companies and donors, develop and offer information gathering and sharing mechanisms and appropriate capacity building programmes for comprehensive technical skills acquisition by small scale miners.

J C

4.2.5 Lack of collaboration between small and large scale mining

There are few examples of collaborative partnerships between small scale miners and larger operators in the mining and minerals sector. On the contrary, the relationship is frequently one of conflict. The coexistence of large and small scale mining activity in an area can create conflict over land. Larger companies are concerned about the impact of illegal and uncontrolled small scale mining activities on their concessions, and small scale miners resent their larger counterparts' refusal to allow them to exploit resources that are not viable for larger operations.

Successful examples of collaboration exist. A collaborative approach, resulting in a successful relationship, has been established at an Ingwe colliery in South Africa (Hentschel *et al.* 2001). In Tanzania, TANSCAN and Anglo American Exploration have been active in collaborating with the small scale miners (RT1 ITDG), but in the same country there have been violent clashes between large- and small scale operators. Large-scale industries have access to smelters and markets, to in-house training facilities and information about prospecting and processing. Small scale miners do not have access to these, and very few of them are involved in collaborative partnerships with large mines. While they have core competencies, they do not have the opportunity to build on these. They do not have linkages with technical partners and exchange programmes, which would facilitate the development of a common sustainable development agenda between them and large companies.

Recommendation 7: small scale miners' associations form collaborative partnerships with companies for mutual benefit.

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Case Study: Relationships between small and large-scale mining in Mozambique

Conflict resulted between exploration companies and small scale miners because small scale miners mined in the concessions of the large mining companies, sometimes at night. In 1998 police had to guard the exploration concession area of North Rand Company in Manica day and night. Small scale miners sometimes mine areas already rehabilitated by big companies, as in Manica at Chua River alluvium, where artisanal miners worked in areas rehabilitated by the ALMA/BENICON company. Large - and small scale mining can interact favourably if small scale miners are allowed to mine areas that are not economically viable for large-scale mining companies. The small scale miners can mine and sell their product to the company. At Great Dyke in Zimbabwe, small scale miners, organised in co-operatives, mine chromite ore and sell it to Zimasco and ZimAlloys. In Mozambique small scale miners were allowed to operate in the ALMA/BENICON concessions with the obligation of selling their production to the company. The positive impact of this interaction is the guarantee of a market for the small scale miners and the possibility of having working tools supplied by the large-scale mining company. The negative impact is related to social benefits of the miners, working hours, safety regulations, and pricing of the product, which is determined by the company. This case creates a situation of over-exploitation of the small scale miners by the large-scale mining companies (RT1 ITDG).

4.2.6 Lack of gender equity in the small scale mining sub-sector.

Women lack access to credit and finance, and are consequently trapped at the subsistence level of mining. A UNIFEM study found that 6% of women miners had been able to access loans for their operations (Hentschel *et al.* 2001). It is also difficult, often impossible, for a woman to obtain a licence. Lower levels of technical knowledge and literacy among women compound these barriers. There is little by way of training in technical areas, business management or in special skills development programmes.

Traditional patriarchal views make it difficult for a woman to advance in the industry, and her full participation is inhibited by her perceived primary role of homemaker. There are a number of very successful women miners, but their initiatives and achievements are not publicized (RT1 ITDG). The perception is that, for women, small scale mining means employment at the lowest level. This perception is reinforced by cultural beliefs. In some areas, the presence of women at operations is believed to invoke bad spirits (RT1 ITDG), or to make the gemstones disappear (RT3 Ranchod).

Policy commitment to empowering women exists within government, the trade unions and within SADC, but translating this commitment into practice remains a key challenge (RT3 Ranchod). Associations for women miners also exist: the SADC Women in Mining Trust, for example, focuses on women working in small scale mining. All countries in the region have such associations for women in mining. There does not, however, seem to be effective coordination and implementation of strategies to materially change the conditions under which women work.

Collaboration is widespread on issues such as advocating and lobbying for marginalized groups like women, but there is always the danger that such collaborative groups can fall under the control of a few influential individuals. There are few support associations for women, and where associations for marginalized groups, such as women miners and child labourers, do exist, they need special support to strengthen their role in the sub-sector (RT1 ITDG).

The empowerment of women in the sub-sector has the potential to alleviate rural poverty. Women tend to spend their incomes on family needs, whereas men may be tempted to spend on prostitution, gambling and alcohol (Hentschel *et al.* 2001).

Recommendation 8: associations for women miners use existing instruments, such as the Beijing Platform of Action, the United Nations Convention on the Elimination of All Forms of Discrimination Against Women and the SADC Heads of Government Declaration on Gender, 1997, to lobby government to ensure equal opportunities for women in small scale mining.

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4.2.7 Child labour in small scale mining

The issue of child labour in the southern African small scale mining sub-sector has been largely neglected. Figures for child labour are not available, but at one site in Tanzania alone, 3,000 children are employed in mining tanzanite, even though the International Labour Organisation's (ILO) Programme on the Elimination of Child Labour (IPEC) is operational in Tanzania (RT1 ITDG). Poverty has an obvious relationship with child labour, and to many mining families, children are a source of additional income. The degree of involvement of children in small scale mining ranges from children who join their parents after school to those in bonded child labour as a result of poverty and the lack of a social security network (RT1 ITDG).

Inadequate, non-existent or unaffordable schooling also contributes to the phenomenon of child labour, as children are left with nothing else to do but work. The problem of child labour is a global one. Children work in small scale mines in Africa, Asia and Latin America. They work long hours without protective equipment and are exposed to health hazards such as gases, fumes and extremes of temperature and humidity levels. Physical strain, fatigue and musculature and skeletal disorders are further factors that make for a poor prognosis for healthy maturation.

ILO Convention No. 182 aims at eliminating the worst forms of child labour, including that in mining. The International Programme on the Elimination of Child Labour (IPEC) aims, by progressive steps, to ultimately end child labour.

Children at a small scale mining operation (courtesy of Intermediate Technology Development Group)

ILO Convention No. 182 is operational in most SADC countries, and a number of them also have policies in place to eradicate child labour. However, the problem persists as governments lack capacity to enforce child labour laws and, where applicable, the implementation of this Convention (RT1 ITDG).

The number of AIDS orphans in the region increases daily, and there is every likelihood that many children who are forced into providing for siblings will turn to the small scale mining sector as a source of income. Their youth, their need for a livelihood and the lack of monitoring means that the opportunities to exploit them are considerable.

Recommendation 9: all governments adopt and monitor the implementation of ILO Convention No. 182 and IPEC to ensure the elimination of the worst forms of child labour in mining.

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Recommendation 10: governments, donors, NGOs and small scale mining associations provide adequate, accessible and affordable schooling and day-care for the children of small scale miners.

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4.2.8 Sustainable growth of the small scale mining sub-sector

There are serious challenges to be overcome if the small scale mining sub-sector is to contribute to sustainable development in the region. However, given the extreme poverty of the sub-sector, and the spillover effects of this poverty, such as child labour and environmental degradation, it is imperative that this is seen as a challenge to all the stakeholders in the mining and minerals sector, and one that can only be met by concerted action. Apart from the recommendations detailed above, there are a number of other actions that would facilitate the move towards sustainable development of this sub-sector. These include increased access to water and affordable fuel, as well as easier access to appropriate mineral deposits. Exclusive Prospecting Orders should be reduced to provide more equitable prospecting opportunities across the mining and minerals sector.

In small scale mining areas, infrastructure and social services are sadly neglected. Rural and tertiary roads are impassable after rains, and health and good educational facilities are located at some distance from the mining areas.

Currently employed methods for environmental assessment and management, such as environmental impact assessment (EIA) and environmental management programmes (EMPs) are complex and expensive and thus not appropriate for small scale mining. Strategic Environmental Assessments (SEA) can be used for areas in which small scale mining occurs to ensure that cumulative environmental degradation is properly managed and that generic operating guidelines are drawn up for operations.

Other activities, even rudimentary ones such as informal buying and selling at markets and stalls, should be encouraged and facilitated. Small scale mining has the potential to be a source of income and employment for rural communities. If the sub-sector is organised and regulated, secondary economic activities become possible. The introduction of technology means that machinery has to be purchased and serviced, materials will be needed for the production system and roads may have to be built or maintained (RT1 ITDG).

Recommendation 11: where appropriate, areas for small scale mining activities are identified within local development planning processes; environmental management and assessment tools, such as strategic environmental assessment and cumulative effects assessment, are applied to determine the operating and rehabilitation guidelines for small scale miners within a framework of sustainable development

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4.3 HIV/AIDS

HIV/AIDS is arguably the most significant threat to sustainable development in southern Africa. A decade ago, HIV/AIDS was regarded primarily as a health crisis. Today, it is clear that the disease is a development crisis (see Section 3.3.4).

4.3.1 HIV/AIDS and poverty

Poverty has been identified as a key risk factor in the spread of HIV/AIDS (RT2 Elias *et al.*), especially in rural areas. Two factors that encourage the spread of the virus are the gender inequity in these societies and their supply of labour to the mines. A lack of comprehensive development plans, and AIDS deaths, compound the problem of poverty in the rural areas.

Poverty also encourages migration as people move from rural to urban areas to find work. This leads to the breakdown of traditional lifestyles, and the development of behavioural patterns that are conducive to the spread of HIV/AIDS.

Recommendation 12: government, labour and industry initiate and support development plans aimed at alleviating rural poverty in labour sending areas and making affected rural communities less dependent on income from migrant labour.

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People living with AIDS are able to lead a productive life if given proper care, but frequently they are abandoned to sink even deeper into poverty. If they have not been retrained in appropriate skills or encouraged to participate in benefit schemes, their financial resources are drained. A review of a community home-based care program in Zimbabwe shows that most home care programs are more expensive than hospital care. The cost of one home care visit equates to between one and three days in hospital (RT2 Elias *et al.*). In South Africa, companies such as Gold Fields, AngloGold and Anglo American have found that home-based health care is cheaper than hospitalisation for terminal patients (Reichardt, pers. comm. 2001).

Table 4.1: *Global HIV/AIDS statistics, end of 2001 (UNAIDS, 2001).*

Region	Epidemic started	People living with HIV/AIDS	New HI/AIDS infections	Adult prevalence rate	Per cent of HIV-positive adults who are women	Main modes of transmission of HIV
Sub-Saharan Africa	Late 70s / early 80s	28.1 million	3.4 million	8.4 per cent	55 per cent	Hetero
N. Africa & Mid. East	Late 80s	440,000	80,000	0.2 per cent	40 per cent	Hetero, IDU
S. & SE Asia	Late 80s	6.1 million	800,000	0.6 per cent	35 per cent	Hetero, IDU
S. Asia & Pacific	Late 80s	1 million	270,000	0.1 per cent	20 per cent	IDU, hetero, MSM
Latin America	Late 70s / early 80s	1.4 million	130,000	0.6 per cent	30 per cent	MSM, IDU, hetero
Caribbean	Late 70s / early 80s	420,000	60,000	2.2 per cent	50 per cent	Hetero, MSM
E. Europe & Central Asia	Early 90s	1 million	250,000	0.5 per cent	20 per cent	IDU
W. Europe	Late 70s	560,000	30,000	0.3 per cent	25 per cent	MSM, IDU hetero
N. America	Late 70s / early 80s	950,000	45,000	0.6 per cent	20 per cent	MSM, hetero, IDU
Australia & NZ	Late 70s / early 80s	15,000	500	0.1 per cent	10 per cent	MSM
TOTAL		40 million	5 million	1.2 per cent	48 per cent	

Hetero = heterosexual transmission; IDU = transmission through injecting drug use; MSM = sexual transmission through homosexuality.

The financial impact of HIV/AIDS could be more efficiently managed through benefit schemes. Workers are not encouraged by their labour organizations to join these schemes, which companies could administer and governments could subsidise. Little is done to retrain medically boarded employees so that they can still, albeit in a reduced capacity, be economically active.

Case Study: Community home-based care: the Bambisanani Project Model The Bambisanani Project, based in Kokstadt in the Eastern Cape Province of South Africa, is being used by TEBA to develop a model for extending home-based health care and of other health-related development interventions to mineworker-sending areas. TEBA acted as the lead agency to play a co-ordinating and implementing role, but the project is a true partnership, involving:

- the mining industry, which provides funding (initially from Gold Fields, with additional support from Bristol-Myers Squibb),
- unions, who represent their membership,
- government, which assists in design and implementation, as well as directly providing grants, e.g. for orphans,
- NGOs (initially the Planned Parenthood Foundation, Eastern Cape, Hospice, Equity) and,
- researchers, who were primarily interested in the evaluation of income-generating projects.

Support for mineworkers with AIDS is placed in the context of the entire community because care requires a broad range of impacts to be addressed, including: stigma, poverty and loss of economically active people, support for care-givers (particularly the elderly and school-age children), provision of affordable funeral services, increasing food production and relief of pressure on health and social support services. Notably, orphan-care was not part of the original programme, but has had to be included subsequently, because it is now a major issue.

To encourage sustainability, participation in the programme is made conditional on communities organising and electing care supporters independently. This approach makes it more likely that the care-givers and trainers will be trusted.(RT2 Elias *et al.*)

Recommendation 13: governments, labour and companies, in co-operation, investigate financially viable programmes to enable workers to join medical benefit schemes so that workers who contract HIV/AIDS are able to receive care without additional financial distress, and government, labour, companies and NGOs initiate and support community home-based care programmes.

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4.3.2 A Multistakeholder Approach to Combating HIV/AIDS

A multistakeholder approach is essential to deal with a challenge as great as that of the HIV/AIDS pandemic. Mining companies have played a leading role in this respect in southern Africa, sometimes accepting a leadership role at national level, as did Debswana Diamond Company in Botswana (RT2 Elias *et al.*). However, neither the responsibility nor the capacity rests with one stakeholder group.

Numerous problems face the establishment of a multistakeholder model. These need to be confronted and addressed, so that trust and a common purpose can be created, which enables stakeholders to build on each other's strengths. A multistakeholder model could:

- allow genuine cooperation between all stakeholders,
- allow open and transparent communication,
- accommodate the priorities of all stakeholders,
- recognise the value of the resources that different stakeholders can provide,
- recognise the constraints that different stakeholders face, and
- allow different stakeholders to take responsibility to avoid domination by one group

(RT2 Elias *et al.*).

The constraints and difficulties involved in setting up multi-stakeholder initiatives are outweighed by the possible benefits from these partnerships. Constraints that have prevented the implementation of such models, and that impact on initiatives to control the spread of, and manage HIV/AIDS, include:

- the different needs and capabilities of stakeholders, which can create unequal power relations,

- barriers to the free flow of information between stakeholder groups,
- the lack of a comprehensive survey of interventions that have failed and succeeded,
- insufficient capacity, which hinders the expansion of successful multistakeholder projects,
- successful initiatives that are at risk when initial funding runs out,
- inadequate service provision in health care, and the lack of access to such services in rural communities,
- a lack of resources, and information on available resources,
- a lack of trust and a common driving force between stakeholders, and
- a lack of clear policies and guidelines, which have been developed by some stakeholders but are not available to all interested and affected parties,

(RT2 Elias *et al.*).

In a multistakeholder partnership, the sharing of resources, facilities and information becomes possible. The capacity lacking in one stakeholder group can be supplemented from another stakeholder group. Companies have expertise in financial and project management that can be used to add capacity to CBOs and NGOs. In their turn, CBOs and NGOs have extensive experience in community work, and are perceived as more approachable than government and industry. Communities themselves have undertaken much of the care for AIDS orphans, but they need land and facilities, which government can supply.

Labour has a large constituency which, in co-operation with industry, it could mobilize in the prevention and management of HIV/AIDS.

Pharmaceutical companies have technical expertise and extensive knowledge and experience of the medical aspects of HIV/AIDS. These are strengths generally needed by non-scientific stakeholders. Researchers have analytical and development skills, which are not generally available to the same extent in other stakeholders, but they are, in turn, highly dependent on the resources, infrastructure and cooperation of such stakeholders.

Individually, initiatives lack the critical mass necessary to influence the progression of HIV/AIDS, but, by drawing together the strengths of a number of stakeholders, a multistakeholder partnership will increase their collective impact.

Case Study: The Ernest Oppenheimer Hospital in Welkom, which is part of Anglo American group health services, is shortly to become an accredited HIV/AIDS vaccine-testing centre. Such accreditation brings opportunities to participate in cutting-edge research and development, and the possibilities for stakeholders associated with these organisations to be amongst the first to benefit from innovations. (RT2 Elias *et al.*)

Several multistakeholder HIV/AIDS interventions have been launched in southern Africa.

- **Mpumalanga (Powerbelt) Project -** launched in 2000, this is still in the process of being implemented. It is unique in attemp ting to address a variety of sectors (e.g. mining, power-generation, water supply, etc.), through a comprehensive approach, including: prevalence surveys, awareness education, door-to-door peer education, wellness programmes, STI and tuberculosis treatment, micro-business development, housing and workplace discrimination.
- **The Tebelopele VCT** initiative in Botswana is a collaborative multistakeholder project, established to create a network of free, anonymous, voluntary HIV counselling and testing (VCT) centres throughout Botswana. The government and the Centre for Disease Control (Atlanta, USA) are the two main stakeholders. However, Debswana Diamond Company became an active partner in March 2001. Company participation also benefits the larger community and not just its own employees.
- **The Wellcome Trust** recently initiated a 3-year project in Harare, Zimbabwe, to investigate primary health care in small and medium-sized enterprises (SME). By bringing together researchers, donors, companies and employees, the project provides an arrangement from which each stakeholder can benefit (RT2 Elias *et al.*).

The projects have uniformly delivered positive and encouraging results in terms of metrics such as knowledge, attitude and practices (KAP) statistics, condom use, and reductions in both the incidence and prevalence of HIV, STI's and tuberculosis. However, they suffered from similar characteristic problems, namely:

- as the scope of projects increases, so does their cost, implementation timescale, management complexity and potential lack of co-ordination between stakeholders, and

- uncertainties about the future of some projects once initial project funding comes to an end
  (RT2 Elias *et al.*).

A lack of financial resources is a key problem for those involved in HIV/AIDS initiatives, and the use of available funding needs to be prioritised. Donor organisations, which focus on national economic indicators when allocating funding, could interact with NGOs and government to establish the underlying situation and so target their funds effectively. Although Botswana and South Africa, for example, are classified as middle-income countries, large numbers of people still live below the poverty line (RT2 Elias *et al.*).

Recommendation 14: all stakeholders in the sector develop national HIV/AIDS management programmes in partnership with each other and with international donors and the pharmaceutical industry.

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4.3.3 Gender inequity as a contributory cause of HIV/AIDS

Table 4.1 shows that 55 per cent of adults who died of AIDS during 2000 were women. In South Africa, by 2020, mortality for women is predicted to peak in the 30-34 age group (RT2 Elias *et al.*).

There is a close relationship between gender issues and the spread of the epidemic. As a result of values and traditions, many women in Africa are not empowered to refuse sex or to insist on the use of condoms. If they were, it is unlikely that the epidemic would have reached such an enormous scale. Many men believe that women, apart from their own wives, have many sexual partners and that women in general are "responsible" for spreading HIV (RT2 Elias *et al.*).

It is common for boys to grow up in the belief that sex at will is their right, and girls are commonly socialised into believing that they have a 'duty' to satisfy male sexual needs. One of the reasons why women contract HIV at a faster rate than men is because men have more sexually active partners and thus more opportunities to transmit the disease to women. In addition to such cultural and traditional issues, women are also biologically more vulnerable to infection than men (RT2 Elias *et al.*).

Poverty is a key risk factor in the spread of HIV/AIDS, and women suffer most from the effects of poverty. They are among the most disenfranchised and marginalized sectors of the population, and their personal empowerment must be facilitated by economic empowerment.

Migrant labourers have money and leisure time at their disposal, and very often their main choices for entertainment are sex and alcohol. The commercial sex trade in mining communities is a flourishing one, but largely unregulated and illegal. Because of the disempowered position of sex workers, who are trying to earn a living, they are not in a position to negotiate safe sex, and they become a conduit for the transmission of HIV. The reality of the trade should be accepted, so that it can be regulated and appropriately managed.

The system of single-sex housing at mines also impacts on women with regard to HIV/AIDS. Separated from their families, men indulge in increased sexual activity with women in the mining communities who are selling sex to earn an income. 'Survival sex' relationships, in which a woman is disempowered by her need for an income, are a further indication of the effects of poverty on women (RT2 Elias *et al.*).

Recommendation 15: women are made less vulnerable to HIV/AIDS infection through economic and educational empowerment, and governments, NGOs and companies support such empowerment.

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Case Study: Employer initiatives changing living conditions

Several Billiton group companies have maintained HIV prevalence at levels substantially less than those of the surrounding communities. Prevalence is 11% at Hillside Aluminium, located in KwaZulu-Natal, where adult prevalence exceeds 30%. Predictive modelling indicates that, by maintaining prevalence around 10%, Billiton will reduce the effect of HIV/AIDS on costs to around 2-3% if medical costs can continue to be borne by medical aid schemes. These promising results are attributed to company policy to reduce risk factors by:

- giving preference to the local recruitment of labour,
- phasing out hostel systems and moving to individual housing allowances, and maintaining a family-friendly environment where hostels still operate,
- placing a greater emphasis on qualifications by increasing the proportion of employees with matriculation, and
- requiring compulsory participation in private medical aid schemes (introduced in 2001).

These steps were taken in addition to more common measures including vigorous STI campaigns, and the use of periodic presumptive treatment amongst sex workers. Anglo American have had a similar experience at their Namakwa Sands operation in the Western Cape province of South Africa, where the predominantly locally recruited workforce has a prevalence of only 2% (RT2 Elias *et al.*).

4.3.4 Migrant labour as a contributory cause of HIV/AIDS

Migrant labour favours the increased transmission of HIV, as men, including mineworkers, who are predominantly migrant single men, are infected by casual sex partners. Further transmission is likely when migrant workers return to their homes for leave or on the expiry of their contracts. The quality of the transport infrastructure, which is very good throughout most of the region, promotes the rapid spread of HIV into the rural areas.

Recommendation 16: where practical, affordable and supported by residents, the move towards replacing single-sex hostels, which have been identified as one of the critical channels for the transmission of HIV, with family housing units, is accelerated.

4.3.5 Employment opportunities

People living with AIDS (PLWA) frequently find themselves out of work and shunned by the community. There is, however, great potential for them to be gainfully employed and to make a positive contribution to HIV/AIDS initiatives. They can be trained to develop and implement information and awareness programmes in the workplace, and used as counsellors. People will find it easier to disclose their status to somebody who has AIDS than to clinic staff, who are often over-worked and unsympathetic. PLWA who are seen to be leading a productive life can help to dispel the stigma attached to AIDS, and the resultant discrimination against colleagues and community members who are HIV-positive. Organisations who have implemented such employment of PLWA have reported positive impacts (RT2 Elias *et al.*) and the practice should be extended, not only in companies but also in NGOs, CBOs and other stakeholder groups.

Some mines have considered encouraging HIV-positive employees to take early retirement by retraining them and re-scheduling benefits. They would then still be well enough to undertake alternative income-generating activities outside the mine (RT2 Elias *et al.*). If they were trained in HIV/AIDS support, other stakeholders who do not have the capacity to undertake such training could take them into employment.

Companies should consider retaining medically boarded employees in different capacities more appropriate to their state of health. With proper care, HIV-positive employees can make positive contributions to companies for many years.

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Case Study: Encouraging the HIV-positive to take early retirement. Several mining companies are investigating innovative methods to reduce the impact of HIV/AIDS on the families of mineworkers who are unable to continue working. At Lonmin's Western Platinum operation, HIV-positive employees who are faced with medical boarding can nominate candidates as possible replacements. This provides an important opportunity for employment benefits to remain within the immediate or extended family of the affected person. The impact of the loss of income is therefore mitigated. This solution is, however, only likely to be practical for jobs that do not involve high levels of skills (RT2 Elias *et al.*)

Recommendation 17: where feasible and appropriate, stakeholders, especially companies and labour, facilitate the retention of people living with AIDS as productive members of the workforce for as long as possible.

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4.3.6 Lack of commitment to good governance

Although mining companies are well positioned to play the leading role in such a multi-stakeholder approach, government is a key player. As HIV/AIDS is a regional problem, SADC and national policies need to be harmonized. However, much can be done before such accord is achieved, and individual companies have taken the initiative and begun work with their stakeholders, even where regional accord is not established.

Health authorities in the region are among the weakest and least capacitated in the world, and governments have not managed the epidemic effectively. Critics of governments point out that they focus on policy rather than implementation, and that they do not do enough to build capacity in NGOs or involve them fully as partners (RT2 Elias *et al.*).

There are numerous areas in which governments need to accept responsibility as the overall curator of the health and well being of their people. The number of AIDS orphans has reached crisis proportions, and land, facilities and resources are urgently needed to address the problem. Education and interventions aimed at children are vitally important and need to be entrenched in national curricula. With respect to funding of NGOs and CBOs, donors come and go, and government is the only possible source of permanent funding. HIV/AIDS has to be made a mainstream budget item, with the creation of full-time posts (RT2 Elias *et al.*).

Reasonable, sensitive and accessible healthcare should be provided. In Africa most patients with sexually transmitted infections (STI) are unlikely to get effective treatment in under-resourced clinics (RT2 Elias *et al.*). Healthcare is the responsibility of governments, and they have to take the lead in this respect, while industry and labour should play a supporting role.

HIV/AIDS cannot be managed in an unstable environment. The main causes of instability in the southern African region are the breakdown of civil society and economic failure. Governments rightly bear the bulk of the responsibility for maintaining stability, but all stakeholders can and must play a supportive role to achieve stability in the region (RT2 Elias *et al.*). The environment of poor health services, poverty and instability is emphasised in Article 128 of NEPAD:

> *Africa is home to major endemic diseases. Bacteria and parasites carried by insects, the movement of people and other carriers thrive, favoured as they are by weak environmental policies and poor living conditions. One of the major impediments facing African development efforts is the wide-spread incidence of communicable diseases, in particular HIV/AIDS, tuberculosis and malaria. Unless these epidemics are brought under control, real gains in human development will remain a pipe dream.*

(Government Communications, 2001b).

Recommendation 18: all stakeholders, led by governments, commit themselves to good governance, so that the HIV/AIDS pandemic can be effectively managed and their people are protected from the escalation of the disease.

4.4 Mining and society

Economic and social systems are intimately linked. Consequently the mining and minerals sector, an important component of the regional economy, has a significant impact on society. The large number of jobs the industry provides, the role it plays in the settlement patterns of people, the services it provides and the social disruption it causes are examples of this influence. The poverty of many southern African people is in stark contrast to the mineral wealth of the region. A primary goal in southern Africa must therefore be to utilise this mineral wealth to improve the health, income and living conditions of the poor majority.

An awareness of the social risks associated with the mining and minerals sector is the first step towards reducing negative impacts and enhancing the positive contributions the sector can make. To ensure that the costs and benefits of a mining project are more equitably distributed, a participatory approach, with clear division of responsibilities agreed upon early in the process, is required.

Poor community/mine relations can lead to tension and violence and hinder progress towards long-term sustainability. All affected stakeholders must be involved in planning and decision-making to promote the sustainability of the mining project and the community within which it occurs.

"It is only those opportunities with high levels of sustainability and couched within the resource capacity of participating stakeholders that should be at the core of interactions between mining companies and communities." (RT3 Choshi)

4.4.1 Poverty and resettlement

Resettlement programmes inevitably have the greatest impacts on rural communities, which are already poor. Resettlement must not add to their poverty, but there is a very real threat that it could do so.

- ***Landlessness.*** A failure to reconstruct or replace lost production systems (land) with income-generating employment can result in landlessness and impoverishment.
- ***Joblessness.*** The risk of losing employment is high. Unemployment or under-employment results from resettlement if not addressed immediately after relocation.
- ***Homelessness.*** For some resettlers a worsening in housing standards or loss thereof is a reality. A decline in housing conditions increases if compensation for lost housing is assessed at market value rather than replacement value.
- ***Marginalisation.*** Displaced persons lose economic power, skills become redundant, markets become closed and social and psychological depression results. The resettled person, viewed as a stranger, is denied opportunities in the host community and experiences a drop in social status, lack of confidence, feelings of injustice and heightened vulnerability.
- ***Food insecurity*** results when resettlement goes wrong. Malnourishment results from deficient calorie-protein intake, and the incidence of morbidity and mortality depend on the effectiveness with which landlessness and joblessness are dealt.
- ***Increased morbidity and mortality.*** Malnourishment, stress and anxiety cause health levels to decline. Unsanitary conditions favour parasitic and vector-borne diseases such as malaria and bilharzia. The young, old and frail are particularly susceptible.
- ***Loss of access to common property resources.*** Income loss and a decline in living standards result from the loss of common property such as grazing lands, woodlands, water and burial grounds. Resettlers tend to encroach on protected areas and on the host community's resources.
- ***Social disarticulation.*** Displacement breaks patterns of social organisation and interpersonal ties. The net loss of social capital and information compounds the loss of natural, human and physical capital. The social capital is usually unperceived and uncompensated by the responsible development projects.

The goal must be to re-establish individual livelihoods and communities with as little delay, and as little disruption to both the re-settlers and the receiving community, as possible. Host communities may experience risks such as increased pressure on resources and services and environmental impacts. Therefore, it is important to provide opportunities and compensation to the host communities as well (RT3 Sonnenberg & Münster).

Resettlement is not always avoidable, but a carefully designed programme, which avoids delays in implementation and compensation, can minimise the risk of deepening poverty in the resettled community. The question of compensation, which should be sufficient and appropriate, has given rise to numerous disputes.

Compensation must cover the time lag between resettlement and

the re-establishment of assets such as crops. The valuation of assets should be done in close consultation with the community and with the use of experts such as resource economists (RT3 Sonnenberg & Münster).

Recommendation 19: companies institute resettlement policies which are formulated in close consultation with the affected communities and which ensure that the disruption of the livelihoods and development of individuals and communities is minimised.

P

Resettlement programmes commonly only have sufficient funding to relocate affected communities and reconstruct their houses. This does not allow for adequate planning before resettlement occurs, nor for the re-establishment of livelihoods after resettlement. Planning that encompasses the interests and concerns of all stakeholders necessitates their involvement from the earliest opportunity, and throughout the process.

Resettlement policies are inadequate and not harmonised across the region, in spite of the availability of guidelines such as the *World Bank Operational Directive - 4.30 Involuntary Resettlement* and the World Commission on Dams Report. Use of these guidelines in the development of national resettlement guidelines, policies and laws, can improve resettlement practice (RT3 Sonnenberg & Münster).

Mining companies and associations must develop an approach to resettlement which recognises that joint planning is required between mining companies and communities. Any company - initiated process must interact with government processes, and where a government process does not exist, industry and communities must take the lead in initiating their own process. Detailed planning and comprehensive engagement are essential to develop voluntary guidelines that can apply to individual companies and industry associations.

Recommendation 20: if resettlement is unavoidable, companies determine whether there are national guidelines for resettlement and, where no guidelines exist, use the following guidelines
1) World Bank Report OD430 and
2) the report of the World Commission on Dams.

C

The inflexibility of many Resettlement Action Plans (RAPs) and their budgets, together with a lack of detailed early planning, often result in the need for large cash injections later. Increased poverty and food shortages result from short-sighted planning which does not take the cropping cycle into account when planning the timing of resettlement. Resettlement plans that are run only for the period of the actual physical resettlement do not address the losses to the community arising from missed growing seasons and other time-related activities. If guidelines which aim to minimise the impact of resettlement are to be developed, comprehensive monitoring is necessary during and after the actual resettlement.

Recommendation 21: to guide resettlement, governments develop guidelines and legislation, implemented in partnership with companies, that are used to support integrated social development plans, and are flexible and include sufficient economic data for decision making.

C

4.4.2 Local development

A mining operation has the potential to benefit the surrounding community in a number of ways:

- multiplier effects can be localised to facilitate local skills development and economic upliftment,
- technical and financial support to build economic self-sufficiency,
- training in skills such as management, governance and

leadership to sustain development,
- out-sourcing of services, and
- training of the local labour force to avoid importing expatriate labour.

A mine has a finite life, and closure often leaves the local community without alternative sources of income. Training in marketable skills during the lifetime of the operation, both for the workers and the local community, would increase the sustainability of any local development initiative beyond the life of the mine.

The lack of involvement of local authorities in mining and minerals operations is responsible for inappropriate development projects and technologies. Consequently, such projects do not always meet the requirements of the local communities. Some countries have policies in place, such as the South African Local Economic Development Policy, which provide guidelines for municipalities to be involved at every level of local economic development initiatives in their areas. However, the mining sector does not play a significant role in the development plans of most municipalities (RT3 Choshi). This is partly due to undemocratic local structures, lack of capacity at local level and the continuing control of local structures by national parent organisations.

Mine projects have the potential to serve as catalysts for local economic development, especially when they are aligned with integrated development planning. There are opportunities associated with each stage of a mining project's life cycle. These opportunities range from employment, human resources, small businesses and infrastructure development to service delivery, the generation of revenue and post-closure local economic development. Effective stakeholder interaction at the planning phase of mining projects is critical as it allows participating stakeholders to benefit from each other's resources (RT3 Choshi).

In many communities, constraints such as an unfavourable location and a lack of access to credit inhibit the development of local enterprises. Tailoring local development opportunities to the needs of the mine can offset such constraints.

Local development is multidimensional, and requires a multifaceted, multi-stakeholder response. This can only occur through the free flow of information. Stakeholders are often ignorant of developments that affect them because public information campaigns using local radio stations, the print media and poster campaigns are seldom conducted.

Recommendation 22: stakeholders, particularly companies, government and NGOs, through consultation, capacity building, information sharing and, where possible, joint decision-making, ensure that the surrounding community is fully informed of, and involved in, any developments which affect it.

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Case Study: Richards Bay Minerals: Social Investment

Richards Bay Minerals was established in a largely underdeveloped area with inadequate infrastructure and facilities, especially in neighbouring rural areas. This led to the establishment of a number of community partnerships focusing on the provision of schooling, health services, job creation and community development.

These partnerships are based on five principles:
- meaningful community involvement adopting a bottom-up approach,
- partnerships rather than benevolence,
- development at the pace dictated by the community,
- skills transference and,
- ownership and self-sufficiency.

Promoting technical education

The funding and development of the Tisand Technical High School, in partnership with the KwaZulu-Natal Department of Education and Culture, pre-empted global trends towards acquiring practical knowledge and skills. In 1996, this project received international recognition by winning the "Global Best" award for "Community Development through Partnerships". The school has workshops to provide training in the electronics, metal work, motor mechanics and electrical fields. It also has technical drawing rooms, chemistry and physics laboratories, a computer centre, a library and a career guidance centre. There is also an indoor sports centre as well as outdoor sports facilities. Apart from preparing pupils to enter higher education or to be prepared for the world of work, the school further serves the wider community through its outreach programmes. It also makes its facilities available for training, sporting events and functions.

Recommendation 23: where appropriate, companies, in partnership with communities, identify and address development opportunities and constraints in local communities by means of technical and financial support and outsourcing.

J C P

Most of the benefit from mining does not accrue at local level, and no incentive regimes exist to encourage companies to promote local social development and so improve local benefit. Local development plans, which do not emphasise mining, do not organise and optimise the opportunity for communities to benefit from mining.

In many parts of the region, undemocratic systems operate within local government, hindering progress towards sustainable development. Capacity building and education programmes for local government have been inadequate, even though these are important tools with which to bring this tier of government in line with the requirements of democracy (RT3 Choshi).

A framework is required for the formulation of policies governing the interactions between mining and communities. Poor relations between stakeholders retard local development initiatives. Where responsibilities have been clearly defined and objectives expressed, stakeholder relationships are stronger, to the benefit of development.

Recommendation 24: governments establish incentives for companies to promote local social development and all stakeholders co-operate to clearly define responsibilities and objectives in local development initiatives.

C

4.4.3 Privatisation & social management

Government, private investors and international financial organisations see privatisation as a viable way of reviving under-performing state assets. This process frequently leads to redundancies. Communities are deprived of what may be their only livelihood. In the absence of effectively designed and implemented interventions, drawn up participatively by all the stakeholders involved, the resultant social problems are likely to deepen the distress of the community. Without ongoing interaction between stakeholders in the planning, implementation and monitoring of restructuring or privatisation, potential benefits of privatisation will not be realised nor shared equitably.

Possible effects of privatisation cannot be determined without undertaking a comprehensive social assessment before embarking on the privatisation of a state asset or restructuring a private asset. Due diligence studies determining the nature of investment and possible socio-economic impacts will support this.

Weaker stakeholders, such as communities, do not benefit from privatisation conducted without comprehensive planning frameworks. These frameworks must contain clear socio-economic development objectives, developed by the state. The inclusion of social concerns in project planning and approval processes affords vulnerable communities some protection. If the project is to be sustainable, social values should be an integral part of the newly formed organisations and of state departments.

Recommendation 25: governments establish stakeholder fora, guided by planning frameworks, to direct privatisation and restructuring and to implement social impact assessment and post-implementation monitoring of a social fund.

4.4.4 Gender equity

Women in the community

The mining environment has never been gender-sensitive. There are few opportunities for women in communities surrounding mine operations, and they are rarely there as workers - they are simply the wives of mine employees.

Even if women have marketable skills, the isolation of mining sites, the lack of credit and insecurity of tenure make it extremely difficult for them to participate in economic activities.

Women are seldom consulted, or their views listened to. They are not identified as a stakeholder group in their own right, and consultation with the community is not broad-based enough to include women as a group with specific concerns (RT3 Musvoto).

Recommendation 26: companies ensure that their community consultation policies are broad-based enough to include women as a stakeholder group in their own right so that their concerns are given fair weighting.

G C

Mining companies assist communities in areas such as health, education and infrastructure development, and have assisted in establishing small enterprises which benefit local people. There are no gender-disaggregated data on the beneficiaries of some of these community projects, but indications are that fewer women have benefited. In a community irrigation scheme sponsored by a mining company in Zimbabwe, only 20 per cent of the plot holders are women and they are not poor, but powerful landholders. This ignores the fact that, as plot holders, women could control crop production and enhance household food security. The criteria used to select plot holders effectively discriminated again single women, widows and the poor (RT3 Musvoto).

Four dimensions of poverty , which need to be addressed in the context of women in the mining community, are: economic opportunity, capacity, security and empowerment (RT3 Musvoto).

Women in mining communities have little economic opportunity. They are not prioritised when mines outsource services, and little encouragement is given to them to subcontract and provide services. Lack of access to finance, either from financial institutions or the mine itself, means that they cannot start a business of their own. In many mining communities the markets are small, and even selling food is difficult, as women have to compete with the farmers around the community who produce food for sale themselves.

Skills training is, in general, restricted to the mineworker. Women function as providers of food and child-minders. In the event of a loss of the spouse's income, they are expected to carry out these responsibilities on a reduced income, and they are not equipped to supplement the household income by undertaking income-generating activities. Materially and psychologically, women thus feel the effects of mine closure or downscaling more sharply than men.

The houses the women live in belong to the mine, their spouses' income is derived from the mine, and they are aware that a mine is of a temporary nature. When it closes, or downscales, their homes, schools and other community infrastructure may be lost, as would be any informal activities, such as vending, that they carry out in a market which is mine-related.

It is not only her role in the family structure that disempowers a women, but her lack of access to financial opportunities, which keeps her in a subordinate position in the family and community, with no voice in decisions. She is further disempowered by the failure of mine management to ensure that critical information, such as retrenchment or a downscaling of social services, reaches her. This information is usually conveyed to the spouse, and there is no guarantee that the woman will hear about it until the event occurs.

Recommendation 27: companies, NGOs, governments and the community itself ensure that women have an equitable opportunity to share in the benefits accruing to the community, whether these are local development initiatives, employment opportunities or skills development.

G C P J

Research in the mining sector in southern Africa does not adequately address the situation, and issues of women who are resident at large-scale mining settlements are poorly represented in research, as evidenced by the absence of literature on the topic (RT3 Musvoto).

Women in the Workplace

Compared to other industries, the integration of women in the mining industry has been slow, and the industry remains a male-dominated one. Currently, there is no industry strategy for integrating women into the sector in southern Africa (RT3 Ranchod).

The reasons for the under-representation of women in the industry are poorly quantified. Some of these relate to acculturated attitudes, such as those that maintain that women will distract men in the workplace and that they belong in the home. In some cases, legislation acts as an impediment to employing women on an equal basis. In Zambia, the law does not allow for women and youths below the age of 21 to work underground except by virtue of an exemption, which can be granted upon application (Masialeti, pers. comm., 2001).

The mining industry is not proactive in its recruitment of women. On average, skills and development training are not freely available to them, and they are seldom specifically targeted for bursaries and scholarships. Their promotion and advancement within the industry are slow (RT3 Ranchod).

The situation is bleaker for black women. Because of historical patterns of education, black women are found mainly in unskilled positions, while white women occupy professional posts. There are a few women in management positions, and they are largely white (RT3 Ranchod).

Recommendation 28: companies and labour adopt proactive policies to facilitate women's entry into the workplace and to promote their advancement; financial institutions, development agencies and learning institutions support these initiatives.

G C J

There is very little published research on women in mining in the SADC region. This lack is also noticeable globally, and the area of gender and mining appears to be vastly under-researched.

A lack of reliable (rather than anecdotal) data hampers efforts to create equitable conditions for women to enter and remain in employment in the industry. It also inhibits the development of legislation that is gender-sensitive. Knowledge gaps that need to be addressed include race/gender dimensions and health and safety. Particularly in regard to the latter issue, scant information is available on the health risks of employing women underground. Uncertainty about what kind of work women can and cannot do is a barrier to their free access to employment.

Recommendation 29: NGOs, research bodies and education institutions investigate issues around gender and mining, and government, companies and labour provide appropriate support for such research.

G C

The southern African political environment is conducive to promoting greater participation of women in mining, but there is a need for greater capacity to monitor and evaluate progress. Policy commitment exists within government, the trade unions and within SADC (see Section 3.2.3), but there is little evidence that this commitment is being translated into practice. The SADC Heads of Government Declaration on Gender states, "…the integration and mainstreaming of gender issues into the SADC Programme of Action and Community Building Initiative is key to the sustainable development of the SADC region." (SADC 1997 in RT3 Ranchod). Section 9 of the South African Constitution precludes discrimination based on gender. These enabling instruments are in contrast to industry's track record in the employment and advancement of women (RT3 Ranchod).

Recommendation 30: SADC and individual governments in southern Africa develop and implement a regional strategy for the integration of women into the mining sector.

G

4.5 The natural system

Mining depends on finite natural resources. It is an extractive process that consumes land and water while exhausting ore bodies. In addition, mining and metallurgical processes generate large quantities of wastes that have resulted in environmental pollution and degradation.

Mining practices have improved dramatically over the last century. New technologies allow for cleaner production and more effective waste management, and stricter environmental legislation ensures improved care of the natural environment. International standards such as the ISO 14 000 series drive the move toward cleaner production and waste minimisation. In southern Africa, much of the legislation is sound, but the capacity of relevant authorities to implement and monitor environmental performance is limited. Major biophysical environmental challenges that face the mining and minerals sector are:

- to reduce land alteration and degradation,
- to effectively rehabilitate previously mined areas,
- to minimize water consumption,
- to implement cleaner production technologies and practices, and
- to minimize pollution of air, soil and water.

Global environmental issues, such as biodiversity and climate change, now influence the ways in which mining companies have to act when deciding where and how to mine, as well as throughout the mining process and after mine closure. Since the livelihoods of many of southern Africa's people depend on the land, mining can have far-reaching impacts, not only on natural systems, but also on the people who depend on these resources for their livelihoods. This implies that people's access to land and other natural resources becomes relevant when mining companies decide to exploit a particular ore body. Many southern African people have no formal tenure system, but utilise resources as they have done for centuries. These informal rights are often disregarded and, as a result, people are denied access to assets that they consider to be theirs.

Mining has the potential to irreversibly destroy indigenous natural areas, some of which may make a significant contribution to biodiversity. Although the intention of rehabilitation is sound, it often cannot re-create lost or modified ecosystems.

Significant areas for biodiversity conservation should be identified as part of regional planning processes to ensure that appropriate environmental management measures are triggered should mining occur within those areas (see recommendation 39).

4.5.1 Rehabilitation

Much is made of the fact that mining is not a sustainable activity. Extraction of ore from a finite deposit in the earth's crust must ultimately come to an end. It is this temporary nature of mining that provides an opportunity to contribute towards sustainable development by vacating land that it occupied for subsequent use. For mine land to be useable, effective rehabilitation must be carried out. Unrehabilitated land is frequently not fit for use and may degrade surrounding land through water and air pollution.

Mining impacts on the land surface in three ways: through surface excavations such as pits, through subsidence resulting from underground mining and through the deposition of waste materials on surface.

Surface mine excavations require complete removal of vegetation, soil and overburden from over the ore body. Soil stockpiles and overburden dumps may be established adjacent to the excavations. These activities result in extensive modification of the area's topography. Fertile topsoil and soil fertility may be lost, the new surfaces may be very susceptible to erosion and the local hydrology may be changed (Chisholm & Dumsday, 1987). This results in land degradation - substantial decrease in land's biological productivity and usefulness (Johnson & Lewis, 1995).

Such impacts are not limited to surface mining. The removal of waste rock and ore from underground mines, which is frequently accompanied by groundwater pumping, may result in surface subsidence and collapse. This alters drainage patterns and often renders land unusable. The deposition of wastes, such as waste rock and tailings, may further degrade land. The deposits sterilise land by covering valuable topsoil and often contain deleterious compounds such as iron sulphides (in coal discards), cyanide (gold tailings) and heavy metals (base metal wastes). Mine waste deposits are highly susceptible to erosion due to a lack of vegetation, steep slopes and the presence of fine dispersed particles (Chisholm & Dumsday, 1987). Eroded materials from

the dumps may be deposited in neighbouring streams or on adjacent farmlands, reducing the economic potential of these resources.

The impacts of mining on land can be ameliorated, in many instances, through effective rehabilitation. A first step in rehabilitating mined land is recontouring of the surface. This should follow the original land contours as far as possible. This is not only for aesthetic considerations, but also to ensure long-term stability of the new surface. The same geomorphic agents that shaped the unmined landscape will act on the new surface, and therefore reinstated landscapes that look natural and aesthetically appealing are likely to be more stable than unnatural landforms (Limpitlaw, *et al.*, 1997).

Case Study: Dune Rehabilitation, Richards Bay Minerals

At the core of forest rehabilitation is the initiation of ecological processes which will result in the development of a dune system similar to that which existed prior to mining. An environmental rehabilitation programme has followed RBM's mining of sand dunes since its inception. At the onset of mining, some 60% of the Tisand mining lease area comprised exotic plantations, whereas some 20% was covered by disturbed grasslands and 20% by indigenous coastal dune forests. The rehabilitation programme aims to establish an indigenous coastal dune forest on one third of the area being mined by the company. The remaining two thirds of the area is revegetated with Casuarina equisetifolia for the development of a local charcoal industry. These proportions are determined by the landowner.Continuing development of the vegetation occurs with the natural establishment of broad-leaved forest tree species such as Natal Mahogany (Trichelia emetica), Coastal Red Milkwood (Mimusops caffra) and White Ironwood (Vepris lanceolata). These species colonise the areas in the shade of the Sweet Thorns 12 to 14 years after the initiation of dune regeneration. The recovery of the dune vegetation is associated with the development of a variety of animal communities. These animals colonise the rehabilitating habitats of their own accord. Only two of the 18 species recorded in nearby mature forests along the coastline have not colonised the areas that have been under rehabilitation for some 20 years. The development of plant and animal communities enables mined areas to mature into self-sustained dune forests typical of the region (RBM, 2001).

Dredge mining at Richards Bay Minerals, South Africa

Unrehabilitated dunes after dredge mining

Rehabilitated dune area at Richards Bay Minerals twenty years after dredge mining (photographs courtesy of Richard Bay Minerals)

Preserving topsoil is of key importance in rehabilitating mined land. Sub-soils and underlying rocks are expected to take decades to centuries to weather, and they represent an inhospitable environment for plants in the short to medium term.

Plant species that will not only control erosion, but will provide vegetative diversity, should be re-established on disturbed land. Through natural succession, these species should contribute to a stable ecosystem, compatible with the surrounding landscape (Tewary, *et al.*, 1996).

The goal of sustainable development with regard to the natural system is to ensure equitable and sustainable use of the environment and natural resources for the benefit of present and future generations. To achieve this, the mining and minerals sector will have to[6]:

- minimize the impacts of their activities on land, water, air and biological communities,
- operate within the carrying capacity of the ecosystems in which they are located,
- foster an understanding of the value of the area's natural heritage, and
- minimise the exhaustion of non-renewable resources by, for example, sponsoring and promoting research and development in product recycling, waste minimisation and the search for alternative raw materials.

Since water is a critical resource in semi-arid southern Africa, and due to the need to focus in the short time period available to produce this report, the biophysical research concentrated on the water resources and water quality of the region.

This report assesses the Zambezi, Limpopo and Olifants catchments, as these are rivers of great importance in southern Africa (see Figure 4.3). These river systems supply water across national boundaries, and numerous large and small mining operations are located within their catchment areas.

However, stakeholders recognise the need for additional research to address specific issues and recommendations, for example, how issues such as atmospheric emissions, biodiversity loss, groundwater impacts and noise impacts of mining can be mitigated in the region. An important consideration is that attention should be extended to mining and mineral processing impacts on land, air and near-shore marine ecosystems. The report on the global MMSD process, of which this report forms a part, discusses a wide range of environmental challenges which are relevant to southern Africa. These include the management of large volume waste, acid mine drainage, mine closure, energy usage and threats to biodiversity. The global report can be accessed at www.iied.org/mmsd/.

The recommendations relating to the three catchments covered in this study, shown in Figure 4.3, could be applied to other catchments in the region.

Recommendation 31: to assist the sector to manage the impacts of mining and minerals processing on the natural environment that were not covered by the MMSD research component, detailed research programmes are commissioned in the region to focus on those additional aspects.

C

Small scale mining has severe negative impacts on the natural systems. Specific concerns relate to accelerated erosion of de-vegetated areas adjacent to workings and increased suspended sediment loads in nearby streams and rivers (RT4 Ashton *et al.*). Many of these small operations do not have cost-effective and efficient technology to manage their operations in a sustainable manner, and the environmental costs of their activities are frequently externalised.

Several organisations are doing successful work to help the small scale mining sector to pursue its activities in a less environmentally damaging manner. Although the general attitude towards the sector is often dismissive and negative, there are signs that these organisations and other stakeholders, who are also affected by small scale mining activities, are prepared to assist small scale miners to improve their environmental performance.

[6] MMSD SOUTHERN AFRICA. 2001. *Locating the mining and minerals sector within the southern African vision for sustainable development.* **http://www.mining.wits.ac.za**

A recommendation that would assist the small scale mining sector, and also other stakeholders, is to ensure a wider appreciation of available effluent treatment technologies by the exchange of technical information between stakeholders. Additional treatment technology manuals should be published and small scale mining associations should ensure that these are accessible and affordable to their members (see recommendation 6).

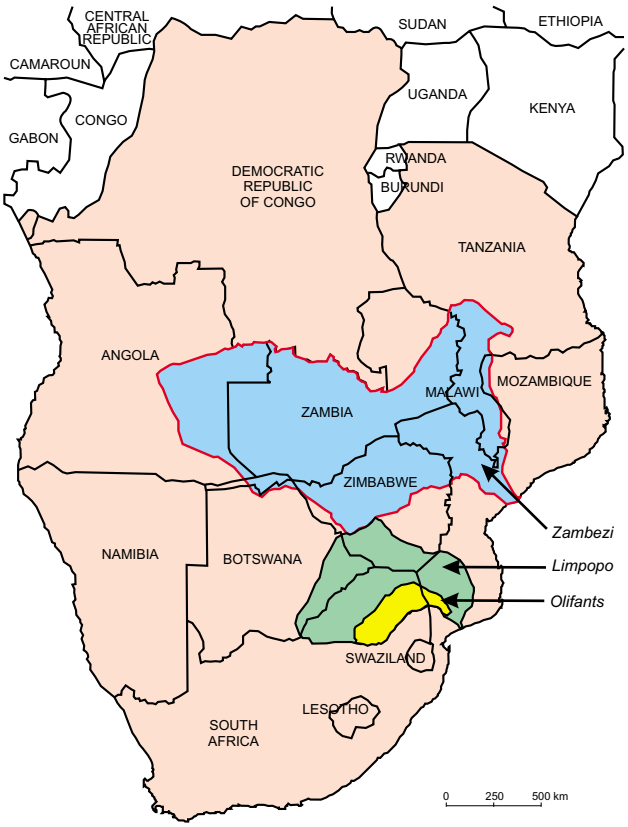

Figure 4.3: *Map of southern Africa, showing the twelve mainland African countries of the Southern African Development Community (SADC, shaded) and the location and extent of the Zambezi, Limpopo and Olifants basins (RT4 Ashton et al.). These basins formed the focus areas for the MMSD SOUTHERN AFRICA - Biophysical Research.*

4.5.2 A collaborative approach to information dissemination, capacity building and skills development

There are already a number of examples of collaborative approaches to regional environmental problems, such as large-scale air and water pollution, which have been implemented in the region. The COALTECH 2020 Project in the Olifants catchment is an excellent example of such collaboration (RT4 Ashton *et al.*). This initiative will enable the mines concerned to extend their working life, improve efficiency of mining processes and deal more effectively with the problems of acid rock drainage.

Recommendation 32: stakeholders, particularly government and mining companies, adopt collaborative approaches, including cumulative effects assessment, to develop a framework for the management and mitigation of the biophysical impacts of mining.

C

4.5.3 A lack of harmonization in SADC legislation, policies and databases

The issue of water is a regional one, and needs to be managed on a regional level. Currently there are incipient disputes over access to, and utilisation of, shared water resources in many SADC countries. Many of these originate in disagreements over the precise positions of international boundaries between countries, but most are "up-stream/down-stream" disagreements. The recent SADC Protocol on shared watercourse systems provides a useful framework for resolution of many of these disputes.

Individual countries maintain their own records and seldom share these with neighbours. The ability of countries to act in concert with one another when it comes to resolving water supply and water pollution problems in shared river basins is reduced as a result of this. Many databases contain incomplete data and several river systems are not yet monitored. This hampers effective management of environmental impacts and decreases the ability of individual countries to predict likely future changes in water quantity and quality. The situation can be improved dramatically if the countries concerned can agree on standardised data collection and curation procedures.

Each SADC country has several policies, standards and pieces of legislation that are designed to control and manage impacts on the biophysical environment. Because several different government

departments often administer these, the overlap and lack of clarity and cohesion limits effective management. The problem is compounded by the fact that different countries that share the same water resource often have conflicting policies and legislative requirements. This situation can be addressed if all the countries and their relevant government departments co-operate to harmonize their respective statutes and legislation.

Case Study: Water pollution resulting from the use of mercury in small scale mining

The contamination of water and rivers is not only due to mining in Mozambique. The Mazoe, Luenha, Revue and Zambezi rivers, flow through Mozambique to the Indian Ocean, from Zimbabwe, Zambia and Malawi, where the use of mercury is also a common practice, and contribute to water contamination downstream. In the long term, this could lead to mercury accumulation in river sediments, which is likely to become methylated through microbial activity and transformed into highly toxic methylmercury. If this occurs, methylmercury, which is readily accumulated in fish and other aquatic organisms, can undergo biomagnification up to the food chain.

The communities in the vicinity of the mining sites are exposed to mercury through inhalation and/or drinking of contaminated water. The non-gold mining communities, especially downstream, are also at risk of exposure to methylmercury by consumption of mercury-contaminated fish. Vegetables grown on the riverbank are irrigated using contaminated river water (RT1 ITDG).

Recommendation 33: SADC governments harmonize their legislation and database compilation to optimise the management of environmental impacts and to minimize disputes over shared natural resources.

C

Acid mine drainage (courtesy of M. Viljoen)

4.5.4 Mine-specific water pollution

Several specific water pollution problems of concern have been identified for mines located in certain geographic areas. The most important of these are:

- heavy metals, such as chrome, vanadium, copper, lead, cadmium and zinc in mine seepage,
- mercury in effluents flowing from alluvial gold-mining operations,
- arsenic from mines located in Greenstone belts, and
- acidic and highly saline seepage from most mines exploiting sulphide ore bodies,

(RT4 Ashton *et al.*).

The presence of excessive heavy metals, cyanide and other components of mining effluents have widespread toxic effects on most living organisms in rivers and streams. In addition, these

substances also reduce the fitness of the water for human consumption and other uses.

Most of these problems can be alleviated by effective seepage collection systems and effluent treatment, using processes designed to remove the specific metal of concern. Several mines have already implemented such collection and treatment systems with great success. This practice needs to be extended to other operating mines that do not have effective collection and treatment systems.

The presence of cyanide in effluent from gold mines can be effectively dealt with by following the latest guidelines on cyanide management, *South African Guideline on Cyanide Management for Gold Mining*, prepared by a multistakeholder committee, through the Chamber of Mines (CMSA, 2001).

An important issue that is common to most mines relates to the need to minimise water use and water loss. This is particularly important in view of the fact that most SADC countries are facing increasing water stress and shortages. Useful advances in minimising water use and water loss through improved tailings management have been achieved by several mines operating in drier areas of southern Africa.

Case Study: Anglo Coal Water Management Project
In 1995, Anglo Coal started a comprehensive water management project to eliminate, prevent or minimise pollution of surface and groundwater. Reduction in water use is an important part of the strategy to minimise water pollution and maximise the reclamation and re-use of waste water. Substantial reductions have been achieved over the past five years, and Anglo Coal currently uses 80 litres of water per run of mine tonne (romt). The division has set a goal to use less than 30 litres/romt in opencast and 60 litres/romt in underground mines. Whereas some of their opencast collieries in South Africa have historically used up to 120 litres/romt, most of these are now close to achieving the target. (Anglo American, 2000)

Recommendation 34: companies and regulatory authorities adopt policies that effectively reduce the negative impacts of seepage on the environment and minimize water loss and water use.

4.6 Managing mineral wealth

Without accelerated economic growth, coupled with greater equity and self-reliance[7], there can be no sustainable development in southern Africa. The statistics on wealth creation per capita and distribution of basic social services indicate that the region is severely poverty-stricken (see Table 3.5). A clean and healthy environment, access to agricultural land, ability to establish small scale mining operations and employment in the formal mining sector, have been identified as key factors in poverty alleviation (RT5 Cawood). In addition to these requirements, equitable distribution of wealth is fundamental to sustainable development. The equitable distribution of mineral rents also has the potential to alleviate poverty if indigenous rents[8] are managed separately from other government revenues.

4.6.1 Poverty alleviation and employment

Mineral development has historically caused much conflict between the various stakeholders involved. Frequently, a failure to identify and consult with stakeholders early in the project, and to reach consensus on how benefits are to be shared, has increased the likelihood of subsequent conflict. Positive actions in this regard could motivate stakeholders to co-operate to increase the benefits of a mining project, manage stakeholder expectations and maximise their benefits.

The following can promote sustainability of the benefits of mining:

- all recipients of rent must share the common vision of maximising rents,
- the costs and benefits of mining projects must be assessed and equitably distributed between stakeholders - Figure 4.4 is a possible example of such equitable distribution,
- adequate consideration must be given to the social and environmental cost of mining in the assessment,

[7] Southern African economies should be globally competitive, self-sustaining and not reliant on foreign aid to balance their budgets.
[8] Indigenous rent is that part of the mineral rent due to the local or aboriginal community by virtue of their historical occupation of the land. For details, see RT5 Cawood, p19.

- an enabling investment environment, which optimises rent for all stakeholders without eroding the natural resource base, must be established, and,
- a portion of the revenues must be invested in activities that will promote long-term economic stability (MMSD, 2001a).

Historically, host-countries were responsible for the distribution of mineral rents to the various stakeholders. However, many of the benefits of mining were absorbed by government administrations, which triggered a need to propose an alternative distribution model allowing for optimised stakeholder engagement and equitable allocation of rents (RT5 Cawood).

In recent years, international law has placed greater emphasis on the rights of indigenous peoples. Initiatives in this regard are encouraging, but steps need to be taken to ensure that these initiatives culminate in sustainable benefits for local and indigenous communities.

Recommendation 35: governments and companies ensure that early consultation with stakeholders occurs and that consensus is reached on how benefits and costs are to be shared.

C P

Formal employment rates in Africa are extremely low and the continent is in desperate need of employment opportunities, as indicated by the low GDP income per capita shown in Section 3.1. Government policies in the region should aim to increase employment rates to above 50%.

The small scale mining and agricultural sectors are known for their potential to distribute economic benefits widely. They can provide a whole range of economic, social and environmental services because of their potential for rural employment, enterprise development, food security and consequently, alleviation of poverty. However, the recommendations in Section 4.1 will need to be adopted if small scale mining is to contribute to poverty alleviation.

Recommendation 36: governments adopt policies aimed at creating an enabling environment for job creation in large- and small scale mining and minerals industries, and introduce specific incentives and support mechanisms to encourage and marry agricultural and small scale mining activities in rural areas.

C J P

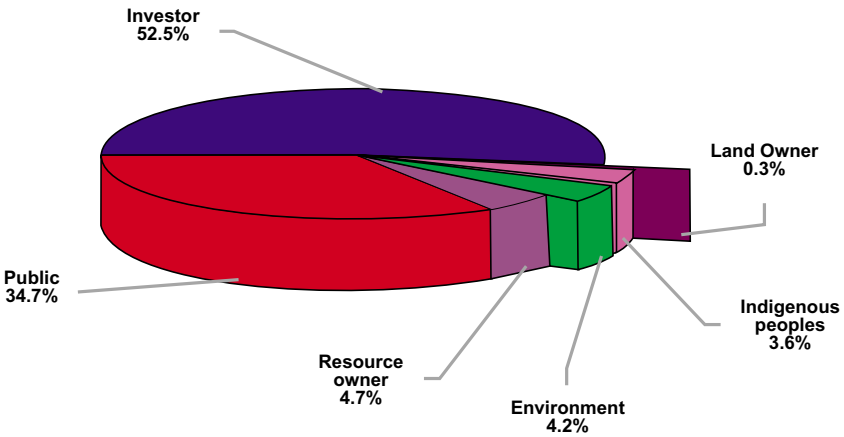

Figure 4.4: *A proposed distribution model for equitable rent allocation (RT5 Cawood). In some jurisdictions the public and the resource owner will be represented by government.*

4.6.2 Skills development, capacity building and information dissemination

The finalisation and enhancement of the geological database currently being established for the SADC region will have significant advantages.

Decisions around mineral resource development need to be made with the widest possible regional picture in mind. Geological features cross state boundaries and such a database would facilitate co-operation between neighbouring states in issuing trans-boundary mineral leases. This has the potential for an increase in volume from a single reserve, rather than the exploitation of a number of uneconomic ones, fragmented by state boundaries.

Faster decision-making as a result of readily available essential information will also increase investor confidence in the region. SADC has already identified this need in its Five-Year Strategies developed in 1992 and 1997 and some progress has already been made in this regard (RT5 MacFarlane). One of the major challenges in establishing a regional database is the backlog of geological mapping in some of these states. Angola, Zambia and the DRC are cases in point.

Apart from geological information, there is a need for information that will facilitate stakeholder engagement, such as geographic information on language, indigenous rights, tribal councils, environmentally sensitive areas, land and mineral ownership, and any information that will reduce the expectation gap of stakeholders.

Recommendation 37: the geoscience organisations in the various southern African states accelerate the current endeavour to establish a common geological database for the region and extend the information system to include information that will facilitate greater stakeholder engagement.

C

4.6.3 Governance

Good governance is essential if mineral wealth is to be managed sustainably and for the benefit of all stakeholders. Many states are highly indebted today in spite of their mineral wealth. If historical malpractice continues, states may remain indebted after the exhaustion of this wealth.

Government policies determine whether an enabling environment for mineral development exists. These policies are normally country-specific, but there are synergies in the region that can be harnessed to establish a regional policy in areas such as environmental protection, protection of infant beneficiation industries against the policies of developed economies, beneficiation incentives, taxation, establishment of joint ventures, restructuring of state mining enterprises and commitment to equitable rent distribution.

Harmonised regional policies will also place southern Africa in a stronger position to address issues such as North-South dynamics and market fundamentals such as supply and demand of mineral production and associated beneficiated goods.

Recommendation 38: governments and SADC align national and regional policies, legislation and government administration models with the goals of sustainable minerals and mining development for the region.

Historically, the decision to approve a mining project is based on the fact that there is land hosting economic minerals, access to labour and a mining company supplying finance. Land-use decisions are still not integrated with development plans or with the principles of sustainable use, and little consideration is given to alternate and possibly more sustainable land-use choices.

Recommendation 39: to ensure that sustainable land use is possible once mining has ceased, governments, in consultation with key stakeholders, determine the end land-use prior to mining authorisation.

Currently, natural capital is not quantified or reflected on a national level, and policy makers do not have access to quality data to guide their policy decisions. The adoption of UN International Accounting Standards to include natural capital in national accounts could address this shortcoming.

Recommendation 40: best practice international accounting standards are used to develop guidelines for a system of valuation standards which reflect natural capital and the associated development costs in the systems of national accounts for the region.

C

At a company level, much progress has been made through the Global Reporting Initiative, and many leading companies now include sustainability reports with their annual financial reports. Such comprehensive reporting promotes key requirements for sustainable development transparency, information sharing and multistakeholder dialogue. It would also be an essential source of information for the compilation of a national resource base, but, in order to serve this function, all companies must undertake such reporting, and global companies must report separately on a country-by-country basis for the southern Africa region.

Recommendation 41: all companies produce sustainability reports as part of their annual financial report, and global companies provide statistics on a country by country basis for the southern African region.

C

4.7 Implementation and inter-linkages

4.7.1 A multistakeholder forum.

The move towards sustainable development can build on the wealth of experience, knowledge and skills in the sector and the region. The momentum that has been created by the MMSD project must not be allowed to dissipate. If all the stakeholders in the sector bring their strengths to a multistakeholder forum to carry the process forward, the mining and minerals sector can make a real and lasting difference to ensure an equitable dispensation for all aspects of sustainable development - governance, society, economic growth and the environment.

A mechanism for implementing these recommendations through a multi-stakeholder forum will be introduced in the following chapter. The idea for such a mechanism arises from the concerns expressed by stakeholders that this report could mark the end of this process, with the possibility of no implementation.

Recommendation 42: a high-level multistakeholder forum is established to implement the recommendations of this report.

4.7.2 The overarching issues.

Section 4.2 refers to the five overarching issues identified by stakeholders as critical for progress to sustainable development. These issues have not been dealt with in focussed research reports, but appear as crosscutting issues in the six research reports and in the recommendations listed above. A brief guide to the recommendations dealing with each critical issue shows their prevalence in the recommendations. Because these are cross-cutting issues, such a categorisation is to some extent artificial. For example, the recommendations relating to governance would, if implemented, impact on poverty alleviation, job creation, gender equity and capacity building.

Poverty alleviation:

Recommendations: 2, 5, 11, 12, 13, 15, 17, 19, 23, 27, 35, 36
In a region where the average daily income is just above US$ 2, per capita it is to be expected that poverty alleviation is a critical issue. It is notable that no expectations of "hand-outs" were articulated in stakeholder interactions. The most important way in which poverty can be alleviated in the above recommendations is through involvement of all stakeholders. The processes involved include education, policy making and facilitating means of avoiding increased poverty, such as joining medical benefit schemes (Recommendation 13). Job creation and capacity building are recommended as means toward poverty alleviation in recommendations 5, 23 and 36, and specific emphasis is placed on the small scale sector of the economy.

Job creation:

Recommendations: 5, 6, 23, 27, 28, 36
Unemployment rates throughout the region are high, and exacerbate poverty and its attendant ills. The minerals sector, on the one hand, contributes to this situation through resettlement, downscaling, closure and retrenchments. On the other hand, the sector can do much to alleviate the problem. The recommendations envisage job creation through education, by providing opportunities for development in local communities and by stimulating the growth of the small scale mining and agricultural sectors.

Capacity building and skills training:

Recommendations: 2, 4, 5, 6, 7,9, 10,11,13,14,15, 17, 20, 21, 22, 23, 24, 26, 27, 28, 29, 31, 32, 33, 35, 36, 37, 40, 41
A lack of skills and capacity is prevalent in the southern African region, and is a challenge in the move towards sustainable development. The recommendations envisage capacity building by a variety of means: education (as in recommendations 5 and 6), government policy (as in recommendations 2, 21 and 35), self-regulation within a stakeholder group (recommendation 7) and consultative and collaborative approaches (recommendations 22 and 32). An imperative in the move to sustainable development is multistakeholder co-operation. This is an aspect of the majority of recommendations, and is epitomised in recommendation 14 which proposes co-operation across a broad spectrum of activities by all stakeholders to deal with the threat of HIV/AIDS.

Governance:

Recommendations: 1, 2, 3, 4, 7, 8, 9, 11, 12, 14, 16, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42
Very few of the recommendations are proposed without the supporting framework of good governance.

If the wealth generated by the mineral sector is to be managed sustainably, and shared equitably between all stakeholders, government policies will determine whether such an enabling environment exists or not.

However, while government should take the lead role, governance is not just the responsibility of the state, but of all stakeholders, and the benefits accruing from good governance affect all stakeholders. A healthy and normalised childhood is envisaged in recommendations 9 and 10. Sound governance is needed to address the situation of marginalised and disempowered sectors of the community, such as women (recommendations 26-30), resettled communities (recommendations 19-21) and those infected with HIV/AIDS (recommendations 12, 13, 14 and 16). Good governance promotes regional co-operation in recommendations 33, 37 and 38. Recommendations 32, 33 and 34 aim to protect the natural environment, and this also needs implementation of enabling policies. In recommendations 35 and 36 the equitable

distribution of the rents from mineral exploitation is ensured by good governance.

The emphasis on good governance in the recommendations aligns with the principles of NEPAD as discussed in Section 3.2.2.

Gender equity:

Recommendations: 8, 15, 26, 27, 28, 29.
In a region where the majority of the population are poor, women are among the poorest. Culturally, historically and economically they are also disempowered and form a significant marginalised group. The recommendations address all these issues, and, in addition, recommendation 8 urges women to take steps to alleviate their position themselves. The main thrust of the recommendations is the empowerment of women, because equity will flow from this. This empowerment is either educational (recommendations 15 and 28), economic (recommendations 15 and 27), job opportunities (recommendations 27 and 28) or by recognition of their status as legitimate stakeholders (recommendation 26).

Although gender issues were singled out for attention by stakeholders, all the recommendations in this report are intended to benefit all stakeholders, including women.

4.7.3 Conclusion

The above discussion does not purport to be an exhaustive examination of the issues and concerns raised by the research reports and by stakeholders. The recommendations discussed were selected on the basis of the "Criteria set by MMSD SOUTHERN AFRICA" listed in the introduction to this section. Readers are referred to the five research reports mentioned in this section for a more detailed exposition of the recommendations and the issues that give rise to them. Reference should also be made to the proceedings of the MMSD SOUTHERN AFRICA Multi-stakeholder Workshop held in Johannesburg on 18/19 September 2001. These documents can be accessed on the CD accompanying this report, by request from **hoadley@egoli.min.wits.ac.za** or on website **http://www.mining.wits.ac.za**.

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5. TOWARDS SUSTAINABLE DEVELOPMENT

The proposed MMSD SOUTHERN AFRICA mechanisms for implementation discussed in this section will be expanded and developed through further stakeholder input.

5.1 Introduction

The different consultative and research components undertaken by MMSD SOUTHERN AFRICA have highlighted a number of key issues of concern that are challenges to the transition to sustainable development in the region.

The priority areas for research, identified by the stakeholders, are described in Chapter 1. Stakeholders expressed reservations that the research and subsequent recommendations would end up where many initiatives had ended up before - gathering dust on shelves. An urgent request was made that a structure or structures should be put in place that could implement the recommendations of the MMSD SOUTHERN AFRICA process. Such a structure would not only be needed to implement recommendations, but also to co-ordinate the move towards sustainable development across the region. Greater regional cooperation was stressed as an essential element of a successful transition to sustainable development.

5.2 A high-level concord

The notion of a high level, credible forum to co-ordinate the overall implementation of MMSD SOUTHERN AFRICA and guide the implementation process is a key recommendation agreed to by stakeholders at the Johannesburg Multistakeholder Workshop held in September 2001. Such a forum, it is envisaged, will provide a platform to take the process forward and build on the stakeholder engagement that this project has initiated. There is also general agreement that possible synergies with the New Partnership for Africa's Development (NEPAD) should be explored.

5.3 The implementation of MMSD SOUTHERN AFRICA and the new partnership for Africa's development

NEPAD provides a cornerstone for sustainable development in Africa. It is a pledge by African leaders, based on a common vision and a firm, shared conviction, that they have a pressing duty to eradicate poverty and to place their countries, both individually and collectively on the path of sustainable development, and at the same time to participate actively in the world economy and body politic. NEPAD is anchored in the determination of Africans to extricate themselves and the continent from the malaise of underdevelopment and exclusion in a globalising world. NEPAD forms a valuable overarching framework for the realisation of the MMSD SOUTHERN AFRICA recommendations in the region and on the African continent (Government Communications, 2001b).

5.4 Possible vehicles for implementation

Existing organisations and institutions could play a role in the implementation of MMSD SOUTHERN AFRICA. Details of the kind of roles these would play are still to be fleshed out, but examples are discussed in Section 5.6. Existing organisations with a potential role in implementing MMSD SOUTHERN AFRICA recommendations include:

- SADC,
- Chambers of Mines,
- Mining Associations,
- Traditional authorities,
- Organised labour,
- Industrial Environmental Forum,
- NGOs/CBOs,
- International organisations,
- Mining companies,
- Geoscience organisations,
- Academic institutions and research organisations,
- Government departments, and,
- Certification authorities.

5.5 A multistakeholder forum

The envisaged forum must establish an executive committee and agree on a concord. The concord needs to be built on a shared vision and a set of principles based on the recommendations arising from the research commissioned by MMSD SOUTHERN AFRICA and from stakeholder input. The shared vision and set of principles must be developed through dialogue between stakeholders. Chambers of Mines and NGOs, working with SADC,

could facilitate multistakeholder dialogue, regionally and in individual countries. All stakeholders must agree on such a statement of principles. The shared vision and consensus on principles will enable stakeholders to move the sector towards sustainable development in the region.

For implementation of the MMSD SOUTHERN AFRICA recommendations, the executive committee must be representative of regional stakeholders and it must have legitimacy and credibility. Individuals involved in the committee will need to be committed to promoting sustainable development in this region and have the requisite expertise for this challenge.

The executive committee will oversee and facilitate a variety of activities in the region that guide the progress to sustainable development. These activities include influencing, guiding, supporting and promoting national structures that will be tasked with the implementation of MMSD SOUTHERN AFRICA within those countries. Such national bodies will facilitate the establishment of multistakeholder consultative fora to debate and implement MMSD SOUTHERN AFRICA recommendations. These fora could establish objectives, indicators and monitoring instruments specific to their countries. The executive committee should appoint a secretariat to support it in the aforementioned tasks.

The executive committee should co-operate with other institutional and philosophical initiatives, such as NEPAD, to ensure that development is pursued in an integrated way. Guidelines, norms and standards to guide and monitor the transition towards sustainable development will require development and review. Efficient sharing of knowledge (e.g. technology and best practice) should be ensured so that countries and individual operations can benefit from lessons learnt. The committee may also focus on supporting government-initiated investment incentives to attract foreign capital without compromising local norms and standards and promoting capacity development within its constituents. Given the centrality of mining to most regional economies, the committee should promote the integration of mining with other forms of land-use through support for integrated development planning. The development of associations to strengthen stakeholders is of great importance.

This initiative will need to be strongly championed by an eminent person from one of the stakeholder groups. It should be one of the first tasks of the multistakeholder forum to identify such a person.

The Concord

Possible Vision: the mining and minerals sector in southern Africa is a key contributor to the region's transition to sustainable development

Possible Principles:

- Openness and transparency
- Broad stakeholder consultation
- Regional
- Democratic regard for individual rights and obligations
- Operating within ecological limit/environmental carrying capacity
- Precautionary principle
- Accountability and good governance
- Access to resources by current and future generations
- Strengthen regional co-operation

5.6 Specific stakeholder group involvement - possible roles

SADC

In the normal course of its operations, SADC could incorporate the recommendations of MMSD SOUTHERN AFRICA into existing protocols, and new protocols could be adopted where there are none. SADC should facilitate harmonisation of policies within the region aimed at giving effect to the recommendations of MMSD SOUTHERN AFRICA.

SADC could facilitate local conventions on MMSD SOUTHERN AFRICA recommendations with the aim of developing implementation frameworks. It should then inform governments of the outcomes of these conventions.

Dialogue among the principal mining countries could be facilitated by SADC and this could lead to greater cooperation between governments to support global mining initiatives.

GOVERNMENTS

Respective governments could consider the feedback from SADC and establish incentives to promote implementation.

INDUSTRY

Industry, as a major player in the implementation of MMSD SOUTHERN AFRICA, must set self-regulatory targets and performance measures. The active participation of small and medium sized companies in setting targets and measures for themselves is crucial.

NGOs

NGOs could monitor and facilitate the implementation by all stakeholders and engage in dialogue with industry on governance issues.

ORGANISED LABOUR

Organised labour can engage with their constituency to promote sustainable development thinking and cooperate with other stakeholders to ensure that all perspectives are incorporated into decisions and policies.

All these actions will foster the creation of an enabling framework for the transition to sustainable development. The implementation of MMSD SOUTHERN AFRICA must apply to, and influence, all levels of the sector, from ministerial to operations and communities. It must not result in the establishment of standards that exclude small actors in the sector.

A possible implementation structure which will enable interaction between key stakeholders is presented in Figure 5.1.

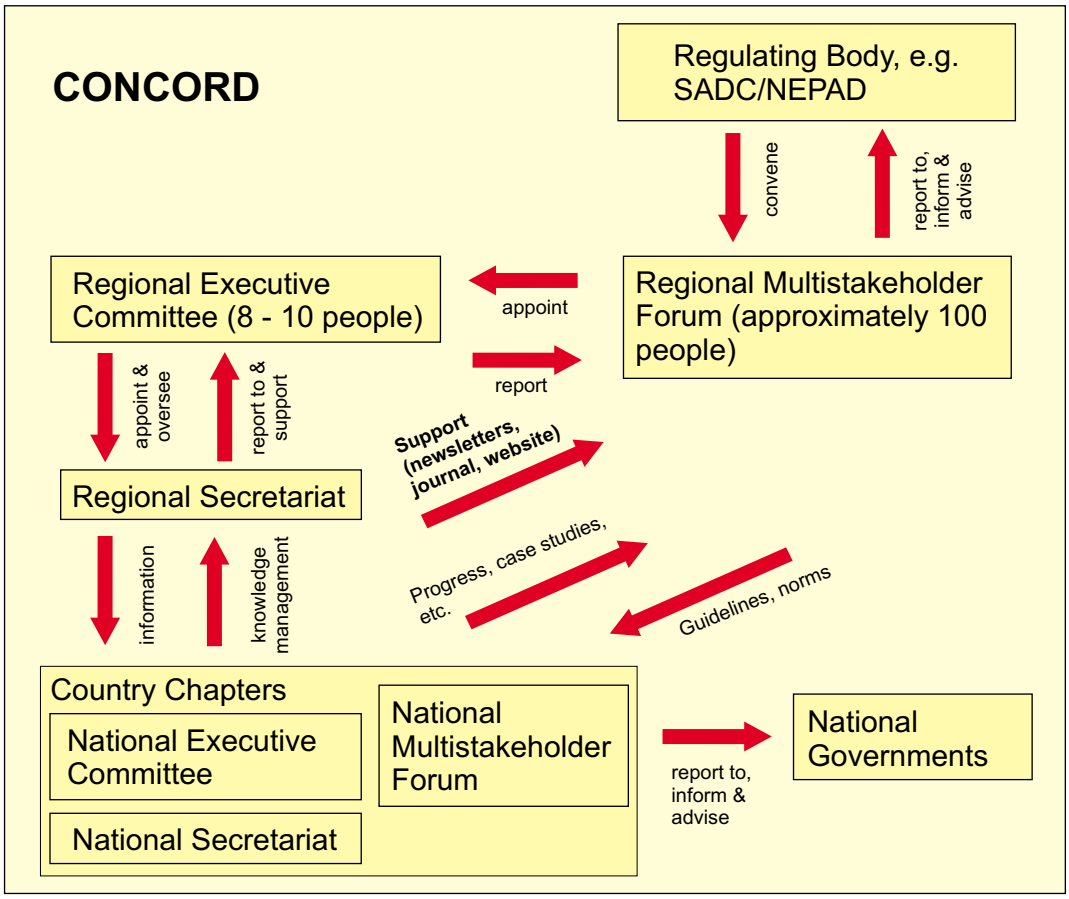

Figure 5.1: *A possible structure for the implementation of the MMSD SOUTHERN AFRICA recommendations.*

5.7 Options for Implementation

Possible ways of carrying forward the recommendations of MMSD SOUTHERN AFRICA have been identified in Table 5.1. Some of these implementation mechanisms may apply specifically at an international, regional, national, community or company level, while others may be used at more than one level. Some mechanisms will serve alone, but many will be applied as packages of measures.

A number of factors can be used to guide the selection of specific mechanisms to implement outcomes from those listed in Table 5.1, including the following:

- identifying linkages to existing initiatives in southern Africa,
- direct application or adaptation to the mining and minerals sector,
- employing packages of mechanisms,
- establishing stakeholder participation and roles, and
- ensuring a balance of responsibilities for implementation.

Table 5.1: *Possible mechanisms for implementing the outcomes of MMSD (MMSD, 2001b).*

Norms and Instruments	Processes	Institutional Responses
Legal and Policy Measures - International/regional agreements - International NGO policies/ statements of principles - National policies - National laws and regulations - Litigation - Professional licensing/accreditation *Market-Based Mechanisms* - Sustainability criteria for investment - Sustainability criteria for lending - Sustainability criteria for commodity trading - Tax incentives/disencentives - Product standards/labelling programmes - Certification programmes *Voluntary Initiatives* - Best practice guidelines or standards - Sector/industry-wide codes of conduct and related programmes - Company-specific codes and policies - Sustainable development reporting norms - Management system/process standards - Supplier challenges/procurement requirements - Government challenges - Government-industry agreements - Company-community agreements - Company-NGO agreements	*Stakeholder Processes* - International stakeholder processes - Regional initiatives and programmes - National sustainable development initiatives - National reconciliation processes *Capacity Development* - Company sustainable development strategy and learning initiatives - National capacity development initiatives *Technological Improvement* - Industry-led technology adaptation/substitution - Technology innovation programmes - Technical assistance programmes	*Institutions* - International commission or council - CEO's forum - Ministers forum - International associations or networks - International inspection panel - International ombudsman - Knowledge Management - Knowledge database/network - Web-based discussion forum *Financial Mechanisms* - Technology phase out/substitution fund - Collective industry fund

5.8 Conclusion

The above recommendations are intended to stimulate discussion about the nature and function of the structures that will implement MMSD SOUTHERN AFRICA's recommendations on how the mining and minerals sector can best contribute to the regional transition towards sustainable development. Their aim is to encourage and promote stakeholder participation in the implementation process from the outset. This will ensure that the momentum generated by the MMSD SOUTHERN AFRICA initiative is not lost. Networks have been formed and a body of knowledge established which can be used to promote sustainable development. These should be exploited, and the dialogue and debate which have been set in motion must be sustained and expanded. The benefits from such dynamic interaction will accrue, not only to the region, but also to the continent.

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