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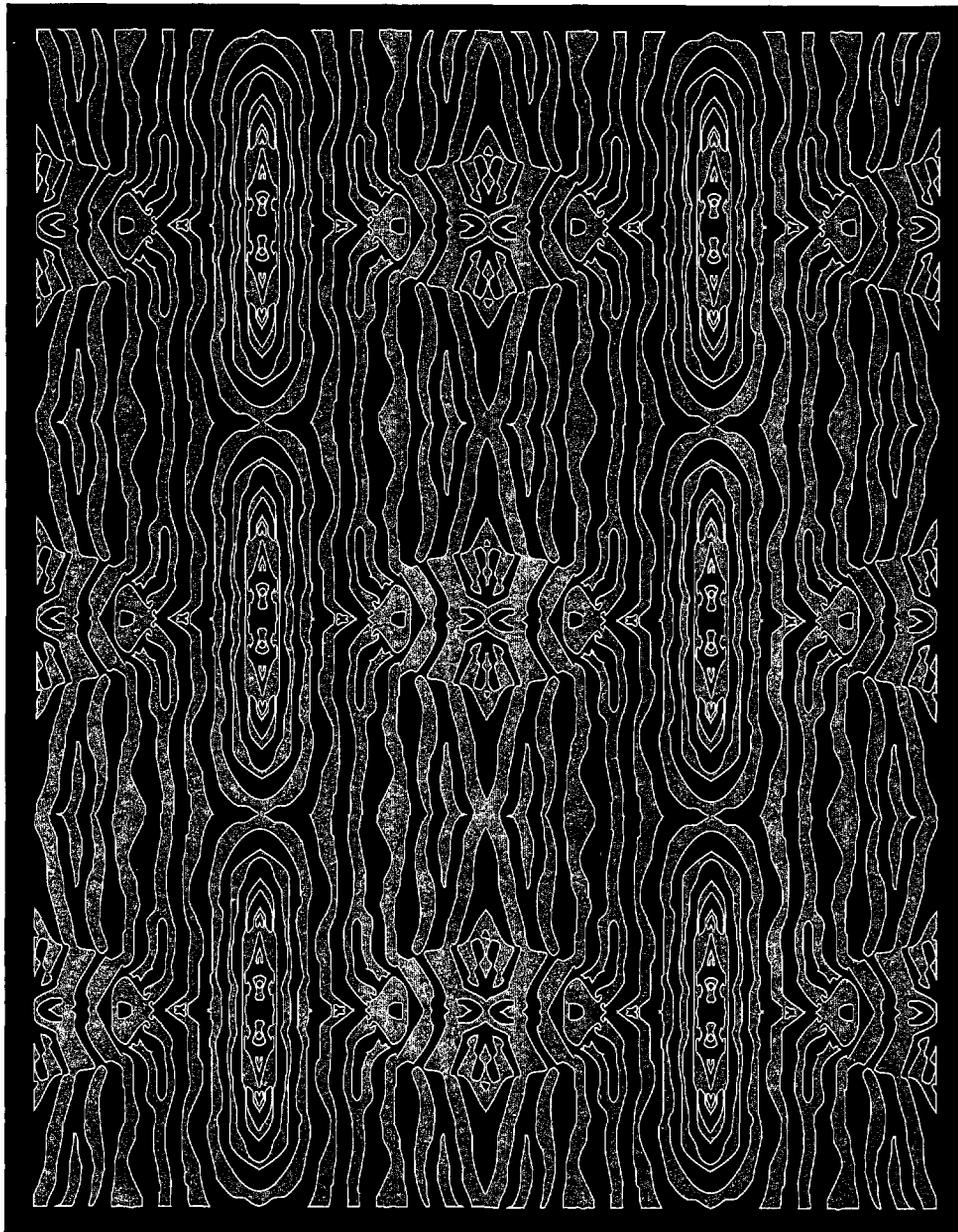


WORLD BANK TECHNICAL PAPER NUMBER 181
AFRICA TECHNICAL DEPARTMENT SERIES

Strategy for African Mining

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AFRICA TECHNICAL DEPARTMENT SERIES

Strategy for African Mining

Mining Unit, Industry and Energy Division

**The World Bank
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Foreword

The mining sector is an important source of tax revenues and foreign exchange which are essential to Africa's economic recovery. Artisanal mining provides a living for nearly one million miners and their families in over thirty countries. Commercial-scale mining takes place in nineteen countries, accounting for nearly one-half of exports, one-third of tax receipts and one-tenth of overall economic activity. The continent is well endowed with mineral resources. Africa has world class deposits and is a major producer of minerals and gemstones such as bauxite, cobalt, copper, diamonds, manganese, rutile and uranium. Furthermore, geological studies indicate that the region has a much greater mining potential than is presently being realized. But, over the past twenty years, new exploration and mining development has lagged behind progress in many other parts of the world. Africa has failed to mobilize the necessary risk capital and investment funds needed for sound and orderly mining development.

This report examines the reasons for the demise of Africa's mining performance, and proposes a strategy for accelerating mining sector growth so that the sector can make a greater contribution to economic activity in the region. The report draws heavily on the experience of World Bank mining work in Africa as well as other regions. The report includes an analysis of mining legislation and taxation arrangements in five countries which have been relatively successful in attracting new private sector mining investment. It also makes use of the results of a survey of the decision making processes and criteria of over forty mining companies regarding exploration and investment in developing countries. At various stages, key insights and findings from the report have been reviewed and discussed on a selective basis with industry experts, potential investors, interested government officials and the academic community.

The bulk of mining production is exported from Africa to international markets.

World mining activity is largely carried out by the private sector and, in particular, international enterprises that have built-up the necessary technical, managerial and financial capabilities to find new deposits and to successfully develop them. African producers, both small and large alike, must be competitive if they are to survive and prosper. If there is to be a significant improvement in mining sector growth, Africa has to align itself more closely with conditions that mining companies and governments have developed in the rest of the world. There is a growing awareness among African governments that reform measures are needed to open up the sector to attract private investors. But, government officials are faced with the questions of how to start, what regulatory and institutional framework is needed, how to protect against possible negative environmental and social impacts, and how to ensure they receive adequate compensation for the resources which are extracted and exported?

This report is addressed to Government officials, donors, academics, the development community at large and the investors themselves. It proposes a mining sector development strategy which is aimed at establishing an enabling environment that recognizes the legitimate needs and interests of both governments and investors and encourages best practices for environmental protection. In particular, it outlines regulatory and fiscal arrangements designed to reconcile the profitability objectives of investors and the revenue objectives of government and proposes institutional arrangements to provide effective implementation. It also provides proposals for regularizing and strengthening artisanal mining. If successful, the strategy should lead to a doubling or even tripling of the present level of exploration and mining development expenditures by the end of the 1990s, which should raise the growth rate of mining from 1 to 2 percent per year at present to 5 to 10 percent per year over the next decade.



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Director
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CONTENTS

Executive Summary	x
1 Current Situation of African Mining	1
Importance of African Mining	1
The Past Performance and Future Outlook for Africa's Mining Sector	4
Industry Structure and the Role of State Mining Enterprise	6
The Policy Choice	9
2 The Mineral Potential of Sub-Saharan Africa	11
Importance of Exploration	11
Regional Geology	12
Comparison of Similar Geological Terranes	13
Required Exploration Financing	14
3 Attracting the Investor	16
Investor Perceptions	16
Implications for Development	18
Lessons from Other Countries	20
4 The Regulatory Framework	21
Mining Codes	21
Mineral Rights and Licences	23
Model Agreements	25
5 Economic and Fiscal Policy	27
Economic Policy	27
Tax Policy	28
The Tax Package	31

6	Institutional Reform	35
	The Five Core Institutions	35
	Reform of State Mining Companies	39
	Artisanal Mining	42
7	Infrastructure and Environment	46
	Infrastructure	46
	Environment, Health and Safety	47
8	Agenda for Africa	52
	Introduction	52
	Actions by Governments	53
	Actions by the Bank and the Other Donors	54
	Annexes	
	Annex 1 - Africa - Ownership and Management of Mining Production in 1989	56
	Annex 2 - Africa Country Assessments: Potential and Exploration Requirements	59
	Annex 3 - Investment Environments for Mining in Selected Countries	69
	Bibliography	75
	Bank Publications by the Industry and Energy Division, Africa Technical Department	77
	External Publications of Industry and Energy Division Work	78

WEIGHTS AND MEASURES AND ACRONYMS

1 Metric ton (mt) = 2,205 lbs

APT	-	Additional Profits Tax
CAR	-	Central African Republic
CBG	-	Compagnie des Bauxites de Guinée
CDM	-	Consolidated Diamond Mines Limited
CODELCO	-	Corporacion Nacional del Cobre de Chile
CoW	-	Contract of Work
GECAMINES	-	Generales des Carrieres et des Mines du Zaire
EDC	-	Export Development Corporation
EEC	-	European Economic Community
EFIC	-	Export Finance Insurance Corporation
ICSID	-	International Center for the Settlement of Investment Disputes
ICC	-	International Chamber of Commerce
MAR	-	Mining Annual Review
MDA	-	Mining Development Agreement
MIGA	-	Multilateral Investment Guarantee Agency
OBK	-	Office des Bauxites de Kindia
OPIC	-	Overseas Private Investment Corporation
SSA	-	Sub Saharan Africa
SGMC	-	State Gold Mining Company Limited
SNIM	-	Société Nationale Industrielle et Minière
UNDP	-	United Nations Development Program
USBM	-	United States Bureau of Mines
WBMS	-	World Bureau of Metal Statistics
ZCCM	-	Zambia Consolidated Copper Mines

EXECUTIVE SUMMARY

Introduction

Mining^{1/} can provide important benefits in terms of exports, foreign exchange earnings and tax receipts to support economic recovery and growth in Africa^{2/}.

Mining now provides about one-third of non-oil exports and one-fifth of total exports for the region as a whole. Commercial-scale mining has developed in nineteen^{3/} African countries, where it averaged forty seven percent of exports, thirty percent of fiscal receipts and ten percent of GDP in 1989.

While mining has an important contribution to make, over the past thirty years the growth of African mining production has lagged behind that of other regions. Significant mining growth has taken place in only a handful of African countries. Mining development has been constrained by insufficient mineral exploration and investment. Although Africa accounts for twenty one percent of world land mass and its mineral resources are known to be large, the continent today attracts only about five percent of the exploration and capital expenditures of the world mining industry. This under-performance of Africa's mining sector and consequent loss of economic opportunity prompted this study.

Mining is a global industry. The paucity of exploration and capital expenditures in Africa is not caused by a worldwide absence of demand for minerals or lack of investment funds. Mining is not a declining industry. Demand projections indicate that future consumption growth rates of most major metals and minerals will continue to be positive and will equal or exceed the growth rates of the past two decades. Mining investments are being made successfully elsewhere in the world. So far, Africa has failed to mobilize the necessary risk capital and development funds to match that progress.

This report examines the reasons for Africa falling behind in the world mining industry and attempts to define what African governments, donor countries, international development institutions, in particular the World Bank, and mining companies need to do to encourage new exploration and investment in mining, so that the sector can contribute more to the economies of African countries.

The main finding of the report is that the recovery of the mining sector in Africa will require a shift in government objectives towards a primary objective of maximizing tax revenues from mining over the long term, rather than pursuing other economic or political objectives such as control of resources or enhancement of employment. This objective will be best achieved by a new policy emphasis whereby governments focus on industry regulation and promotion and private companies take the lead in operating, managing and owning mineral enterprises. That is not to say that only investors should benefit from mining. But in the new policy environment, governments should obtain a fair share of the economic rent of the sector through fiscal arrangements that are stable, competitive and fair, rather than through ownership and operation.

Situation of African Mining

Upon independence, most governments seeking to stress their sovereignty over mineral resources imposed rules and regulations which frequently precluded profitable investment by the private sector. In many cases governments nationalized or took controlling interests in mining enterprises and then, as operators, proceeded to manage them for control and maximum short-term rent collection rather than for long-term growth. Mining revenues were largely diverted to support increased consumption, and in some cases were skimmed for personal gain, instead of being used

for reinvestment for the expansion of mining or of other sectors of the economy.

The large state-controlled enterprises which dominate mining today in several African countries have generally declined in performance. They are subject to government intervention for purposes often unrelated to efficient performance and their operations tend to be less productive than those of private companies. Insufficient reinvestment in maintenance and modernization has resulted in aging operations which are no longer competitive or able to respond flexibly to changes in market conditions.

The public sector orientation of mining policies also supported a dramatic increase in uncontrolled informal mining in many African countries. A significant level of precious metals and gemstone mining in Africa is currently performed by unregistered artisans who export most of their production illegally. African governments do not receive any tax revenues and the environmental costs of illegal artisanal mining can be considerable.

While many African governments concentrated on operating state companies, the mining sector support institutions, including the Ministry of Mines, the Geological Survey and the institutions responsible for mine safety and environmental regulations, became increasingly less effective because of declining expertise and operating resources. Because of this, many African governments are now unable to effectively interface and negotiate with private investors and thus cannot take advantage of the opportunities which would arise from a renewed interest by international mining companies in African mining.

What Could be Achieved

In contrast to countries with excessive state control of their mining industries, a small number of African countries where private management and ownership predominate has been successful in effectively utilizing the mineral potential. In most cases, international mining companies have provided the management and technical capabilities and mobilized the necessary financing for projects to be identified and implemented.

In countries such as Botswana, Gabon, Ghana, Guinea and Niger, new mining development has been successful mainly due to the formation of joint-ventures between the private sector and government. These joint-ventures are managed by the private partner who generally operates under an investment agreement which provides the private investor with explicit guarantees against unreasonable government interference. Mining development has also been successful in Namibia, Sierra Leone, and Zimbabwe where major mining companies are fully owned and operated by private investors.

Countries in Africa as well as in other regions with active and expanding mining sectors show many differences in the policies which are successful in attracting mining investment. There are, however, important common factors: stable and transparent regulations which clearly spell out the rights and obligation of the investor and the government; a competitive and well-structured fiscal regime which provides an adequate return to investors and a fair share to the government; assured access to foreign exchange at market rates for dividend repatriation as well as operational needs; and effective support and monitoring of private mining investment by well-organized government institutions.

Given Africa's substantial mineral resources, successful implementation of macro-economic adjustment programs and effective private sector oriented mining policies, African countries can attract a substantially increased share of world mining investment. This is the necessary condition for revitalizing mining in Africa and returning to strong sustained growth. However, the pipeline of viable projects ready for development is small, due to the long-term neglect of exploration. The few projects in an advanced stage of preparation are largely in those African countries which performed well in the past.

The majority of African countries with mining potential, however, needs a substantial increase in exploration expenditures before major new mining projects can be initiated. A doubling of exploration expenditures in Africa from the present estimated US\$125 million per year to US\$250 million per year would be an achievable

target in the next few years. A more challenging exploration target would be US\$500 million per year, which could realistically be achieved by the end of the 1990s. Such an amount would be close to the current exploration levels in Canada and Australia.

This report identifies sixteen African countries that should be given immediate priority for exploration investment by private mining investors. Given the mineral potential and the capability to absorb investments, Namibia, Zaire, and Zimbabwe would each merit exploration expenditures of over US\$20 million per year; Angola, Botswana, Ethiopia, Ghana, Mozambique, Sudan and Zambia each US\$10-20 million per year; and Burkina Faso, Gabon, Guinea, Kenya, Madagascar and Tanzania each US\$5-10 million per year. Smaller amounts are warranted in priority zones or areas of seven other countries namely: Burundi, CAR, Cote d'Ivoire, Mali, Nigeria and Rwanda.

An increase of exploration expenditures in Africa in the next few years to US\$250 million per year combined with the implementation of a small number of existing viable projects should be an early objective. In the second half of the 1990s, African mining production could steadily increase by 2 to 4 percent per year or more. The suggested exploration expenditures of US\$500 million annually could result in five to ten new mineral projects—with total capital cost of about US\$1,000 million—each year from the late 1990s onwards.

Together with needed annual replacement investment of another US\$1,000 million the total long-term exploration and investment requirements would approach US\$2,500 million per year, about fourteen percent of the current world total. Such an investment volume should raise the annual growth of African mining production to 5-10 percent per year in the next decade. Investment expenditures of US\$2,500 million per year in Africa are well within the capabilities of the international mining companies and, provided government institutions are being strengthened, can also be absorbed without major problems by the African countries.

Agenda for Mining Development in the 1990s

This report holds that African mining can overcome its current difficulties and return to vigorous growth. To achieve this objective, international mining companies have to be motivated to substantially increase their investment in Africa for both expansion of existing operations and for exploration and development of new mines. During the more immediate future, international mining companies can also take a major role in the restructuring and rehabilitation of mining operations which are currently state-owned.

While international mining companies would be the main sources of investment and operating expertise for new mining development in Africa, bilateral and multilateral donors, including the World Bank group, can encourage governments to develop well defined mining policies. Specific assistance by donors should focus on helping African governments: to update mining and investment legislation and tax regulations; to strengthen institutions responsible for supervising the mining sector; to train staff in government institutions for improving their capabilities to administer the mining code and negotiate agreements with investors; to privatize parastatal mining companies; and to establish data bases and promotion programs to attract potential investors. Donors could also support governments in the design and implementation of technical assistance programs for artisanal miners.

As international mining companies will take the lead in investment financing within private-sector led mining development, investment financing by donors would concentrate mainly on mining projects which require a government financial contribution in order to attract private financing. Donor lending for investment may be most supportive in the financing of government participation or infrastructure in new joint-venture mines with majority private partners. Overall, the main objective of donor intervention in African mining—whether through technical assistance or investment financing—should be to facilitate private investment and help reduce the country- and project-related risks for the private investor.

While donor organizations can support in reviving African mining, the main responsibility for achieving the needed changes rests with the African governments. Only the African governments can create a policy environment which will attract private investment to mining. If governments continue to follow a "business-as-usual" policy, increased investment will not materialize and mining will continue to stagnate. Effective measures by African governments, however, would overcome the past: such measures would cover reforming economic and sector policies, strengthening sector institutions and improving exploration and investment promotion.

The study analyses in detail the specific actions which African governments need to take. The study suggests the following agenda of government action for the 1990s:

- Economic adjustment programs should continue to evolve. In African countries with important mining sectors the macroeconomic effects of mining must be fully taken into account. Exchange rate policies should be market based and should be aimed at economic stability. Trade regimes should not be restrictive.
- Governments should clearly spell out their mining development strategies. The private sector should take the lead. Private investors should own and operate mines. The government should promote private investment, establish policies and regulations, supervise implementation of established policies, and monitor the private companies.
- Existing state mining companies should be privatized at the earliest opportunity to improve productivity of the operations and to give a clear signal to investors with respect to the government's intention to follow a private-sector-based strategy.
- The incentives for mining investors should be clearly determined in investment legislation. Taxation of mining companies should be consistent with the taxation of other sectors in the economy, but should take the specific nature of mining as a resource-based industry into account. Mining taxes should be earnings-related rather than output- or input-related to avoid distorting investment and operational decisions. Mining taxation needs to take account of tax levels in other mining countries to maintain or establish competitiveness of the national industry.
- Mining legislation should reduce risk and uncertainty for potential investors and ensure easy access to exploration permits and mining concessions. Permits and concessions should be transferrable with a minimum of government interference. Investment agreements, where required, should provide additional assurances to protect the investor from unwarranted government interference, and provide additional safeguards for the government to ensure that investors will live up to their obligations.
- Mining institutions—Ministry of Mines, Geological Survey, environmental protection and mine safety institutions—in most African countries should be reorganized and strengthened to better perform their promotional, regulatory and monitoring functions. Government institutions should discontinue operational and marketing functions.
- Environmental, health and safety aspects of mining in Africa have been neglected in the past. To ensure sustainable mining development,

appropriate regulations and standards need to be established together with effective monitoring and enforcement capabilities.

- Artisanal mining requires special attention by African governments.

Legalization and improved organization of artisanal mining would generate income in rural areas and provide revenue to the government. Incentive-based marketing systems would reduce illegal exportation of minerals by unlicensed traders.

- 1/ In this report mining includes all non-fuel minerals, gemstones and uranium but excludes coal, oil and gas.
- 2/ Africa is used as an abbreviation for Sub-Saharan Africa. Sub-Saharan Africa is defined exclusive of the Republic of South Africa unless otherwise noted.
- 3/ Angola, Botswana, Burkina Faso, Central African Republic (CAR), Gabon, Ghana, Guinea, Liberia, Mali, Mauritania, Namibia, Niger, Swaziland, Senegal, Sierra Leone, Togo, Zaire, Zambia and Zimbabwe.

1

CURRENT SITUATION OF AFRICAN MINING

Importance of African Mining

Mining in the Sub-Saharan Africa (SSA) region is important to the world, now accounting for about 8 percent of world mine production. For the purpose of this report, mining includes non-fuel minerals, gemstones and uranium; it excludes coal, oil and gas. The region (which

excludes The Republic of South Africa) holds a greater than 10 percent market share in six minerals—bauxite, copper, cobalt, manganese, rutile and uranium—and a 37 percent share of world diamond production as illustrated in Table 1.1. It also holds more modest shares, between 2 to 10 percent, of nine other minerals and metals, namely asbestos, chromite, lead, lithium, iron ore, nickel, tin, phosphate rock and zinc.

Table 1.1 Africa - Major Mineral Producers and Share of World Mine Supply 1989
Volume of Selected Minerals

	Copper	Bauxite	Rutile	Diamonds	Manganese Ore	Cobalt	Uranium
TERMS	000 MT	000 MT	MT	000 Cts.	000 MT	MT	000 MT
Angola				1,272			
Botswana	22			15,251			
CAR				447			
Gabon					2,600		900
Ghana		382		290	280		
Guinea		17,547		230			
Namibia	38			932			3,629
Niger							2,962
Sierra Leone		1,562	128	600			
Swaziland				55			
Zaire	430			17,652		8,314	
Zambia	445					4,490	
Zimbabwe	16						
Total SSA	951	19,491	128	36,729	2,880	12,804	7,491
World Supply	9082	107,963	450	98,500	22,100	19,867	35,586
SSA Share	11%	18%	28%	37%	13%	64%	21%

Source World Bank estimates derived from various sources including Government data, World Bureau of Metal Statistics (WBMS), U.S. Bureau of Mines (USBM) Annual Yearbooks and Mining Annual Review (MAR).

The total value of African exports of non-fuel minerals, gemstones and uranium is estimated at US\$9,000 million in 1989, of which about US\$8,200 million is recorded mining exports and approximately US\$800 million unrecorded artisanal production which is particularly

important in Guinea, Zambia, and Zaire. Five minerals accounted for 81 percent of the value of African recorded mineral exports: copper (US\$2,700 million), diamonds (US\$2,600 million), gold (US\$800 million), bauxite (US\$400 million), and uranium (US\$500 million), Table 1.2.

Table 1.2 Africa - Value of Mineral Exports Summary 1989
(Millions of US\$)

	Copper	Bauxite	Ore	Gold	Diamonds and Gems	Lead/ Zinc	Manga- nese Ore	Nickel	Tin	Cobalt	Uranium	Phosphate Rock	Misc.	Total
Angola					230									230
Botswana	60				1,300			140						1,500
Burkina Faso				30										30
CAR					40									40
Gabon							175				50			225
Ghana		5		150	15		15							185
Guinea		400		45	55								130	630
Liberia			200											200
Mali				25										25
Mauritania			180											180
Namibia	125			10	320	60			10		250		25	800
Niger											230			230
Senegal												80		80
Sierra Leone		25			10								55	90
Swaziland					20								10	30
Togo												115		115
Zaire	1,245			30	250	90			15	170				1,800
Zambia	1,230					40				70				1,340
Zimbabwe	30		10	175				110					85	410
Others				15	10				15				20	60
Total Formal	2,690	430	390	480	2,250	190	190	250	40	240	530	195	325	8,200
Artisanal/ Informal				300	500									800
Total SSA	2,690	430	390	780	2,750	190	190	250	40	240	530	195	325	9,000

a/ Over 95 percent of SSA's mineral production is estimated to be exported and available statistics do not readily permit a separation of the value of production and the value of exports.

Note: Excludes aluminum exports of about US\$300 million from Ghana and Cameroon

Source: World Bank estimates derived from WBMS, USBM Annual Yearbooks, MAR and World Bank country reports and data files.

Although mineral production is widespread, mining of particular minerals is concentrated in a limited number of countries. Zambia and Zaire account for 69 percent of world cobalt and 12 percent of world copper mine production; Guinea is the world's second largest bauxite producer; Sierra Leone the world's second largest rutile producer; Zimbabwe the third largest producer of asbestos; and Gabon the third largest manganese producer. Three African countries, Gabon, Namibia and Niger, account for 24 percent of world uranium production.

The benefits of commercial-scale mining are notable for nineteen African countries. Mining accounts for over seventy percent of exports in Botswana, Guinea, Namibia, Zaire and Zambia, and provides important benefits in fifteen other African countries. Mining provided 47 percent of exports, 30 percent of fiscal receipts, and 10 percent of GDP for these nineteen countries in 1989, Table 1.3. For Sub-Saharan Africa as a whole, mining provides about one-third of non-oil exports and one-fifth of total exports.

Table 1.3 Africa - Economic Contribution of Mining for Selected Countries in 1989

	Formal Mining Exports (US\$ Million)	Mining Exports as % of Total Export	Mining Value Added as % GDP	Mineral Taxes as % of Total Taxes
			----- % -----	
Zaire	1,798	83	16	35
Botswana	1,506	83	51	58
Zambia	1,337	95	13	16
Namibia	799	76	29	36
Guinea	627	82	25	72
Zimbabwe	411	26	6	n.a.
Niger	232	75	6	16
Angola	230	8	2	n.a.
Gabon	225	16	5	n.a.
Liberia	200	58	n.a.	n.a.
Ghana	186	23	2	n.a.
Mauritania	181	41	10	n.a.
Togo	115	22	8	n.a.
Sierra Leone	89	80	6	5
Senegal	76	10	1	n.a.
CAR	40	25	3	n.a.
Burkina Faso	33	15	1	n.a.
Swaziland	30	10	1	n.a.
Mali	25	9	1	1
Total	8,140	47	10	30 ^(a)

(a) estimate

Source: Bank staff estimates derived from World Bank country reports and data files.

Table 1.3 demonstrates that governments can obtain very significant transfers from the mining sector not just for countries with state-owned mining industries, but also from countries with private-controlled mining sectors. In 1989 the three countries where mineral taxes made the largest contribution to the overall tax base (namely: Botswana, Guinea and Namibia) all had privately controlled mining industries. Furthermore, the tax transfers for these three countries were very significant in absolute terms amounting to US\$1,050 million in 1989.

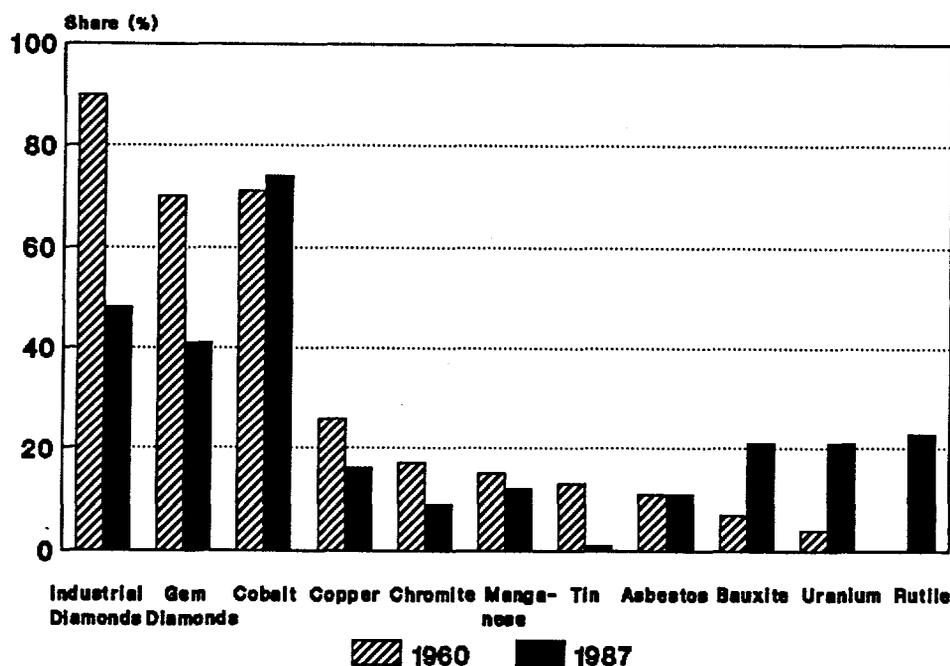
These three countries, Botswana, Guinea and Namibia are prime examples of countries which have encouraged mining development by foreign mining companies and which have benefited considerably from doing so. While the minerals being mined and the legal arrangements differ from country to country, major mining operations have been established in each country under conditions which provide stability and profitability for the mining companies and significant taxation receipts and foreign exchange earnings for the countries.

In Botswana, high quality diamond deposits were discovered in the 1960s and 1970s and subsequently developed and mined in a joint-venture between the Government and De Beers, with the private partner having the operational control. In Guinea, high quality bauxite deposits were found and developed in the 1960s and early 1970s by a consortium of international aluminum companies. The mining company, *Compagnie Bauxite de Guinee* is also a joint-venture between the Government and the consortium with the private partners having operational control. In Namibia, the two major mining operations are the CDM diamond operation and Rossing Uranium owned and operated by De Beers and Rio Tinto Zinc respectively.

The Past Performance and Future Outlook for Africa's Mining Sector

While mining in Africa is important on a world scale, Africa's share in world mineral production except for bauxite, uranium and rutile has fallen since 1960, as illustrated in Figure 1.1.

Figure 1.1 Africa's Share of World Production for Selected Minerals and Metals



Note: World - excluding centrally planned economies.

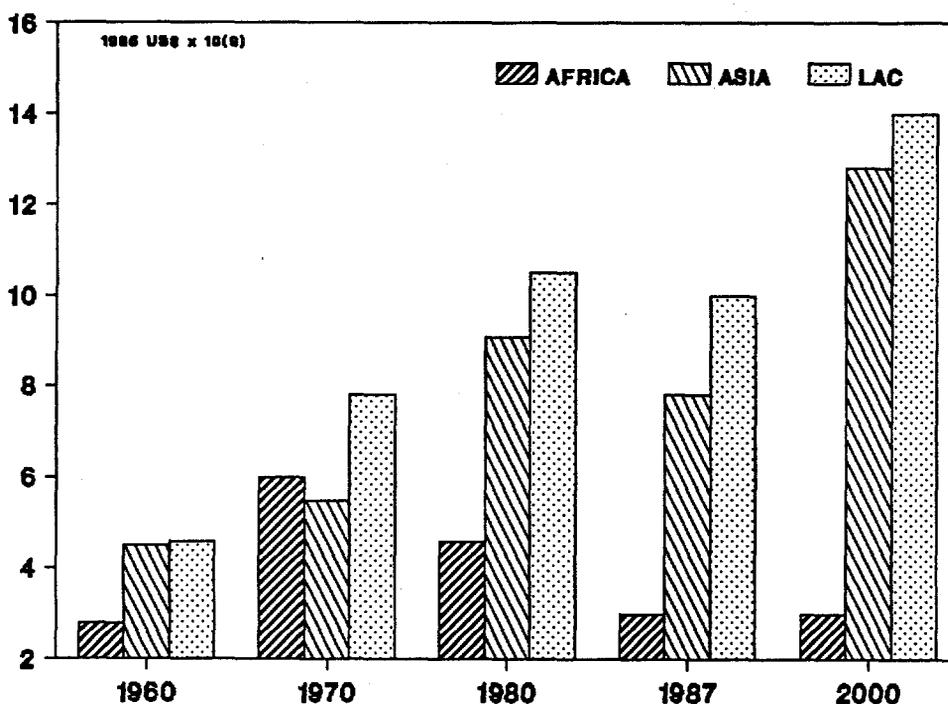
Source: World Bank staff estimates derived from various sources including WBMS, USBM Annual Yearbooks and MAR.

A comparison of the value of production and exports for ten minerals and metals—bauxite, alumina, aluminum, copper, iron ore, lead, zinc, nickel, tin and gold—shows that Africa has lagged far behind Latin America and Asia as illustrated in Figure 1.2. World consumption of most metals and minerals slowed and stagnated during the 1980s in response to world economic difficulties and structural changes in the industrialized countries following the two world oil crises. However, metal and mineral consumption recovered at the end of the 1980s resulting in a strong minerals market boom in 1990.

World Bank projections indicate that demand for most metals and minerals

should return to or exceed the average growth rates for the past two decades which have been in the range of 1 to 2 percent per year. International development of viable, new mining operations is not constrained by a lack of demand or shortage of financing. Supply projections (based on known projects and expansions) indicate that the 1990s should be a period of sustained growth for the mining industries of Latin America and Asia. But Africa is expected to continue to lose ground unless major changes occur, Figure 1.2. The outlook for Africa is not constrained by expected world demand growth for minerals and metals, but by the ability of African producers to compete in the global market place.

Figure 1.2 Comparison of Mineral Production in Africa, Asia and Latin American-Caribbean for Eight Selected Minerals and Metals 1960-2000



Note: Actual and projected gross value for production of aluminum, copper, iron ore, zinc, nickel, lead, tin and gold.

Source: Derived from data in Price Prospects for Major Primary Commodities, World Bank (various issues) and World Bureau of Metal Statistics (various issues).

Industry Structure and the Role of State Mining Enterprises

The bulk of Africa's mining growth in the past thirty years has taken place in privately-operated mines, including several which are joint-ventures between governments and private investors. From 1960 to 1989, the value of production and exports from privately-operated mines (mostly diamonds, bauxite, and uranium) increased by about nearly 350 percent from US\$1,400 million in 1960 to US\$4,800 million in 1989 (both in 1989 terms), Table 1.4.

Table 1.4 Africa - Value of Mineral Exports in 1960 and 1989 Produced by Different Types of Enterprises
(US\$ Million - 1989 terms)

	Mining Exports	
	1960	1989
A. Companies under government control^{1/}		
Copper	1,970	2,440
Diamonds	100	35
Gold	50	145
Bauxite/Alumina	-	80
Uranium	-	-
Others	<u>380</u>	<u>700</u>
Sub Total	2,500	3,400
B. Companies under private control		
Copper	160	465
Diamonds	300	2,055
Gold	180	290
Bauxite/Alumina	120	480
Uranium	30	530
Others	<u>610</u>	<u>980</u>
Sub Total	1,400	4,800
Grand Total	<u>3,900</u>	<u>8,200</u>

^{1/} Includes companies nationalized in the 1960s and 1970s.

Source: World Bank staff estimates

By comparison, Africa's declining market share for several minerals has in large part reflected the lackluster performance of state controlled mines (predominantly copper production) where the

value of production and exports increased from US\$2,500 million to US\$3,400 million in the same period (an increase of only about 36 percent). It must be emphasized that the definition of control used here does not refer to whether or not the state was majority owner. Rather it refers to whether the state took a passive role and permitted a private sector company to manage the mines or whether the state took control and managed the operations through a state-owned parastatal mining company.

A country-by-country analysis of Sub-Saharan African mining shows that the industry is highly concentrated. Three enterprises with exports above US\$1 billion per year account for about half the total formal mining exports: Debswana (Botswana), Gecamines (Zaire) and ZCCM (Zambia). (Fuller details are given in Annex 1). In addition there are thirteen enterprises with annual average exports of US\$100-1,000 million. These sixteen enterprises account for nearly 80 percent of Sub-Saharan Africa's mineral exports as shown in Table 1.5. Unlike the mining industries in countries with very large mining industries, (such as USA, Canada, Australia and South Africa) where much production comes from small and medium sized companies with turnover of US\$50-500 million, there are only a handful of such companies in Africa. This dearth of small and medium sized companies is referred to as the "missing middle."

About 55 percent of African mineral production comes from enterprises which are

Table 1.5. Structure of African Mining Industry in 1989

Enterprise Annual Turnover (US\$ Mill.)	Number of Enterprises	Total Value of Exports (US\$ Mill.)	Cumulative Percentage of Exports
> 1,000	3	4,000	49
250- 1,000	3	895	60
100- 250	10	1,550	79
50- 100	8	540	87
10- 50	32(e)	580	94
< 10	100(e)	635	100
Total	160(e)	8,200	100

Source: World Bank staff estimates

operated and managed by the private sector. This consists of 20 percent from privately owned mining companies and 35 percent from joint-ventures between governments and the private sector, where the private sector is the operating partner. There were seventeen such enterprises with annual sales exceeding US\$50 million in 1989, as shown in Table 1.6. These enterprises accounted for 45 percent of SSA mineral exports in 1989. Most of the 100 percent privately-owned and operated mines are in Namibia, Sierra Leone and Zimbabwe. Private-state joint-ventures which are operated and managed by the private sector partner, and where the state has a generally passive role are in Angola, Botswana, Gabon, Ghana, Guinea, Liberia, Mali, Niger, Swaziland and Zaire.

Table 1.6 Africa - Role and Structure of Privately-Managed Mining in 1989^(a)

Country	Company	Product	Turnover (US\$ Mill.)
Botswana	Debswana	Diamonds	1,300
Guinea	CBG	Bauxite	325
Namibia	CDM	Diamonds	320
Namibia	Rossing	Uranium	250
Angola	ENDIAMA	Diamonds	230
Botswana	BCL	Copper/Nickel/Cobalt	200
Gabon	COMILOG	Manganese	175
Niger	COMINAK	Uranium	150
Guinea	Friguia	Bauxite/Alumina	130
Liberia	Bong	Iron Ore	120 ^(b)
Ghana	Ashanti	Gold	110
Zaire	MIBA	Diamonds	90
Liberia	LAMCO	Iron Ore	80 ^(c)
Niger	SOMAIR	Uranium	80
Guinea	AREDOR	Diamonds	55
Sierra Leone	Sierra Rutile	Rutile	
Gabon	COMUF	Uranium	<u>50</u>
TOTAL			3,730

(a) As noted in the text, these include joint-ventures with partial government ownership where the operator and manager is the private partner. Only companies with turnover in excess of US\$50 million in 1989 are listed.

(b) This company has since closed.

(c) This company has since closed.

Source: World Bank staff estimates.

The balance (about 45 percent) of African mineral production is controlled by parastatal mining companies where the government company is in control of operations. Two parastatal companies (Gecamines in Zaire and ZCCM in Zambia) account for about one third of SSA mining production. There are five other parastatals with annual exports exceeding US\$50 million in 1989. In total these seven state enterprises accounted for 40 percent of SSA mineral exports in 1989. Smaller state-controlled mining companies are found in countries including Burkina Faso, Ethiopia, Ghana, Madagascar, Sierra Leone, Sudan, Tanzania, and Zimbabwe.

Table 1.7 Africa - Role and Structure of State-Managed Mining in 1989^(a)

Country	Company	Products	Turnover 1989 (US\$ Mill.)
Zaire	Gecamines	Copper, cobalt various	1,360
Zambia	ZCCM	Copper, cobalt various	1,340
Zaire	SODIMIZA	Copper	145
Mauritania	SNIM	Iron ore	180
Togo	OTP	Phosphate	115
Guinea	OBK	Bauxite	75
Senegal	CSPT	Phosphate	<u>55</u>
TOTAL			3,270

(a) As noted in the text, these include joint-ventures where the manager and the operator is the government-owned parastatal company. Only companies with turnover in excess of US\$50 million in 1989 are listed.

Source: World Bank staff estimates.

Many of these state mining companies have seen a sharp decline in production since 1975; notably the copper of Gecamines and ZCCM; the gold of SGMC in Ghana; the diamond production of the state mining companies in Ghana, Tanzania and Sierra Leone; and the chromite in Madagascar. Nevertheless, there are examples of state companies where output has grown since 1975. For example, the SNIM iron ore and phosphate companies in Togo and Senegal, and the OBK bauxite company in

Guinea. Most of this increase results from investments in the 1970s.

Changes in the global economy over the past decade have increased the divergence between the performances of private and state-controlled mining companies in most African countries. Most privately-controlled mining companies are entering the 1990's organizationally

lean and operating modern, competitive facilities compared with ten years ago. In contrast, most state-controlled companies are entering the 1990s with little change except that their facilities are 10 years older. The reason for this is in the responses of the two groups of companies to the changes and challenges in the world economy over the past 10 to 15 years, Figure 1.3.

Figure 1.3 Metal Mining in a Changing World

	1960s and 1970s	Early 1980s following second oil crisis	Late 1980s	Early 1990s
EXTERNAL CONDITIONS				
MACRO-ECONOMIC ENVIRONMENT	High levels of economic growth. Availability of petrodollars	Sluggish levels of economic growth. Debt crisis "Troubled Eighties"	Return to levels of economic growth	Slow economic recovery
ATTITUDE TOWARDS DEVELOPING WORLD	Benign; "North-South Dialogue"	Disturbed/Alarmed	Demanding contributions	Pragmatic
AVAILABILITY OF METALS	High growth	Abundant availability of metals	Capacity shortages	Declining
METAL MARKETS	Prediction of shortages "Club of Rome"	Excess capacity depressed "Buyer's Markets"	Mature, healthy growth; "Sellers market"	Sluggish growth uncertain supply/demand balance
MINING COMPANIES FINANCIAL PERFORMANCE				
PRIVATE-OWNED	Abundant cash generating capacity; harvesting cash-cows	Loss-making cash-drain followed by achievement of break-even position	Return to cash generating position	Moderate cash generating position
STATE-OWNED	Abundant cash generating capacity; harvesting cash-cows	Moderate cash generating capacity to loss-making	Loss making to moderate cash generating capacity	Vulnerable for next downturn, having lost competitive position
COMPANIES STRATEGY FOR OPERATIONS				
PRIVATE-OWNED	Rapid expansion of capacity	Cost cutting followed by aggressive restructuring; disposal of assets, introduction of new technology to achieve competitive position		Modest expansion in capacity based on competitive position
STATE-OWNED	Plans to expand	Wait for return to normal Limited efforts to restructure	Rehabilitation programs.	Radical restructuring required through privatization.

Whereas the 1960s and 1970s were characterized by high levels of economic growth and metal consumption, only briefly interrupted by the first oil crisis in 1974, this scenario changed drastically following the second oil crisis in 1979. Confronted with operating losses, high real interest rates, and escalating energy costs, the private companies were forced to address the crisis head on. They embarked on an aggressive cost-competitiveness drive which challenged every aspect of the conduct of their businesses. This drive was directed at company reorganization, reducing overhead and personnel costs, and involved closure and disposal of non-performing assets and the widespread introduction of modern, cost-effective technology.

The response of state-controlled companies was much more modest. They addressed the situation initially with a "wait for a return to normal attitude". When this did not occur, they initiated rehabilitation programs in an effort to modernize their facilities and reduce costs with some limited company restructuring. However, these efforts were hampered by their governments need for revenues and foreign exchange as a result of widening budget deficits and worsening debts. Since their shareholders-owners were not in a position to provide funding for the rehabilitation programs (indeed, most were demanding larger financial contributions by the companies), and did not have ready access to commercial financial markets, the companies turned to, and obtained, limited financing from bilateral and multi-lateral development agencies.

With the upswing in metal prices in the late 1980s, the privately-controlled companies were well placed to reap the benefits of their competitiveness drive. However, the state-controlled companies continued to rely on largely outdated facilities as their rehabilitation and restructuring efforts had been only partially completed and moderately successful. Where state-controlled companies tried to analyze the way business was conducted, their efforts did not result in fundamental or permanent improvements. This was principally because efforts were targeted at a limited number of specific management activities instead of being undertaken as part of an overall business plan.

The Policy Choice

Mining is a global industry. Almost all Africa's mineral production is exported and sold at prices set in the international marketplace. To survive and prosper, African producers must compete with producers in other regions such as Latin America and Asia and with producers in the industrialized countries.

Over the last thirty years mining sector growth in Africa has been constrained by the decision of most newly-independent countries to adopt inward-looking, import-substitution economic policies and state ownership and control of productive facilities. These policies followed the worldwide economic fashion of the time but their damaging results only really became apparent in the decade after the second oil shock of 1979. Developing countries, with less innate wealth to rely upon, were forced to borrow heavily and squeeze their mining industries to meet pressing needs in other sectors of their economies. This situation persists today. In contrast, mining companies in industrialized countries operated in open economies and had to adapt or die.

African governments desiring to develop their mining sectors are faced with a policy choice. They can pursue mineral development by state control of mining activity where the state is manager and operator of the mining company. Alternatively, they can permit and encourage mineral development where the state emphasizes its role as regulator and promoter and leaves operations and management to private sector enterprises. The record is clear—mineral growth in Africa has been predominately achieved by the private sector. Few developing countries in Africa are able to mobilize, within the public sector, the large amounts of managerial, technical and financial resources necessary for commercial-scale mining development.

The main message of this report is that mineral development requires governments to focus on the regulation and promotion of the industry and that private companies take the lead in operating, managing and owning mineral enterprises. But, with the possible exception of Zimbabwe, there are few countries where the

domestic private sector is strong enough to take the lead. The future development of the mining sector in Africa will largely depend on attracting new high risk capital from foreign mining companies—large, medium, and small—who have the technical and managerial capabilities to find new deposits and develop new mining operations.

Africa must compete with other countries to attract such investors. International capital goes to the most attractive opportunities. Mining investments are typically capital intensive investments involving time horizons of ten to twenty years or more. As discussed in Chapters 3 and 4, investors require competitive terms and conditions, and iron clad assurances that the investment environment will be stable and that the "rules of the game" will not change.

But it is not only investors who should benefit from mining. Governments must also obtain a fair share of the economic rent of the sector. This can best be achieved through fiscal arrangements that are stable and fair to both parties. Governments can increase their share of the rent by making the investment environment less risky and thereby lowering the risk premium and returns required by investors and lenders. This can be accomplished by establishing clear mining development strategies and sound institutional structures and capabilities and by emphasizing earnings-related taxes rather than royalties (or input or output related taxes) as outlined in Chapter 5 on Economic and Fiscal Policy.

It is essential that all dealings be transparent on the part of both the governments and the investors. Serious investors will withdraw in the face of corruption or a significant "hassle factor". In such cases, even if deals are made, they are likely to be highly speculative and probably will lead to little real investment or

growth in the mining sector. Correspondingly, serious investors need to recognize the valid concerns of host governments and provide strong training components and local capabilities-building initiatives (such as using local businesses where they can provide supplies and services on a competitive and reliable basis).

In countries where mining is now well established and predominantly a state mining activity, reform is needed. However, most state companies as a result of their multiple objectives, cannot behave like private companies. Trying to reform them from within is an extremely difficult if not impossible task. A better solution is total or partial privatization. Private mining investors will be required for this, and a discussion of how privatization might proceed is given in Chapter 6 on Institutional Reform.

The approach proposed in this report should not be interpreted as turning the clock back to the era when host governments were dependent on the patronage of powerful, foreign companies. What is here proposed is an enlightened partnership between governments and investors who share common objectives of seeing mineral resources identified and developed in an orderly, cost-efficient, environmentally sound manner to the benefit of both parties.

Such a partnership is feasible and achievable. But it will only be realized if the legitimate needs and interests of both government and investors are mutually recognized. This is the hallmark of many successful mining operations in Africa today. When replicated successfully, companies can establish profitable, sound, stable mining ventures, and governments can gain important economic benefits including significant tax transfers and foreign exchange earnings.

2

THE MINERAL POTENTIAL OF SUB-SAHARAN AFRICA

Importance of Exploration

The previous chapter has demonstrated that mining can have important benefits for countries well endowed with mineral resources (such as Botswana, Zaire, Namibia and Guinea). It has also shown that overall Africa has been losing market share to other regions. This chapter examines the African mineral resource base and the need for additional exploration if mineral development is to accelerate in Africa.

The perceived geological potential of a country or region is the fundamental factor which leads to minerals exploration and investment. Given favorable geology, exploration and subsequent mine development will be determined and controlled by government policies and, in most cases, by the quality of infrastructure. If government policies are weak and interventionist, there will be little or no exploration and mine development, except by state agencies.

Exploration is the most critical phase and exploration knowledge worldwide lies principally with the private sector. Exploration technology is changing rapidly: considerable advances have been made even in the past decade. Most private mining companies have had the technical and financial resources to stay abreast of such advances. Most parastatals, facing financial constraints and difficult economic circumstances, have been preoccupied with production and have not established or maintained good exploration capabilities. Today, parastatal mining enterprises data lack the technology and financing to undertake effective exploration activities. As a consequence, mine development in much of Sub-Saharan Africa is stagnating and the geological potential is severely under-utilized.

During the 1980s, world mineral exploration expenditure averaged about US\$2,500

million per year in 1989 terms. Sub-Saharan Africa with 21 percent of the world's land mass accounted for only about 4 percent of this, barely a fifth of that in Canada or Australia and well below that of the Republic of South Africa Table 2.1.

Table 2.1 Estimated Average Annual World Mineral Exploration Expenditure 1980-89^{a/}
(US\$ million 1989 terms)

Australia	560
Canada	600
U.S.A.	360
Republic of South Africa	180
Sub-Saharan Africa	100
<u>Others</u>	<u>700</u>
Total	2,500

^{a/} Excludes USSR and Eastern Europe
Source: Industry and World Bank estimates

Statistics show that major mining countries, regions, and companies invest or attract investment of up to 10 percent of mineral production value in exploration^{a/}. In contrast, many Sub-Saharan African countries attracted (or permitted) investment of about 1 percent of the value of mineral production. This massive under-investment in exploration must be reversed as soon as possible; exploration investment is the only way depleting reserves can be replaced and new discoveries made.

The relationship between exploration investment and production value will change over time for individual countries. An immature mining economy needs to invest, or attract investment, of up to 20 percent or more of production value. Passing to a stage of fast

growth, production will rise rapidly in comparison to exploration and as the ratio between production value and exploration expenditure decreases. A rapidly growing mining economy will need to attract exploration investment in the range of 5 to 10 percent of production value. When a country attains mining maturity and generates much larger revenues, the ratio between production and exploration will continue to decrease, flattening out at 2 to 5 percent. Most African countries fall within the "young- immature" phase and should have a high ratio of investment in exploration to production value if significant growth is to take place.

Various studies are available which examine the relationship between exploration expenditures, discoveries of mineral deposits and subsequent mineral production. Taking into account the results of these studies, as well as information from mining companies and other sources, it is considered that an increase in annual exploration expenditures for Africa to US\$250-500 million per year could lead to a pipeline of 5 to 10 new viable mineral projects each year. Development of these discoveries would require US\$500-1,000 million per year giving total expenditures of US\$750-1,500 million per year, including exploration, from the mid-1990s onwards. This is over and above the funds required to sustain present capacity and make necessary improvements. Such a level of expenditure and development should permit Africa to achieve growth for mineral exports broadly in the range of 5 to 10 percent per year from the late 1990s onwards.

Given the economic conditions of most countries in Africa, such investment cannot be financed by the state-controlled mining companies or other domestic sources. The only realistic source of such very large sums of capital is the international mining industry which currently spends about US\$15,000 million annually on mining investment. Of this, just over half is for replacement capital and the balance for new investments. The industry currently spends another US\$3,000 million on exploration each year.

Thus, to meet required growth targets, Africa needs to attract as much as US\$2,500 million annually in exploration and capital expenditure for both replacement investment and new projects.

This corresponds to about 14 percent of world mining investment expenditures compared with about 5 percent today. Such expenditures are well within the capabilities of international mining companies, and should be within the absorptive capacities of African countries, provided initiatives are taken to strengthen mining sector institutional capabilities as outlined in Chapter 6.

Regional Geology

The geology of Sub-Saharan Africa is dominated by cratons and inter-cratonic mobile belts. Cratons are Precambrian crystalline blocks composed of granite, gneiss and greenstones, which are surrounded by major orogenic provinces known as mobile belts. For most metallic and gem minerals, this basic geological framework provides a strong control over mineralization. Most of the cratons and mobile belts are characterized by so-called greenstones, which are volcano-sedimentary sequences of metamorphosed supra-crustal rocks of volcanic and sedimentary origin. These greenstones are amongst the most favorable rocks for many of the known and yet to be discovered gold and base-metal deposits in Sub-Saharan Africa.

Examples of structurally-associated mineralization are the principal gold belts of Ghana (Ashanti) and Ethiopia (Adola). Good examples of well-known and productive greenstone-associated gold mineralization are central Zimbabwe (Midlands) and the Barberton Belt along the Swaziland and South Africa border. Prime examples of under-developed greenstone belts are those in Burkina Faso (Boromo, Aribinda, Dori-Assakan, and so on), northwest Tanzania, and northern Zaire (Kilo, Moto, Nagayu, Isiro and elsewhere).

Cratonic cover rocks, or depositional basins, are also important hosts for known and potential mineralization. Examples include the Witwatersrand and Tarkwan banket reef gold deposits of South Africa and Ghana respectively; and the younger, unique, copper-cobalt deposits of the Copperbelt of Zambia and Zaire.

Volcanic and igneous activity has been an important factor. The older cratonic-related intrusives in Sub-Saharan Africa are dominated by the South African Bushveld Complex and the Great Dyke of Zimbabwe—the present and

potential future producers of a large percentage of the world's chromium and platinum supplies. The Bushveld Complex is the world's largest known repository of platinum group metals (PGM) and vanadium. The younger volcanics and intrusives are dominated, mineralogically, by the carbonatites which are potential future producers of rare-earth metals and phosphates (for example Angola, Uganda, Tanzania) and in special circumstances, of copper (for example Palabora in South Africa), gold and nickel.

Additionally, crustal movements have led to the formation of large sedimentary deposits. One of these, the Karoo sequence, holds virtually all the known coal deposits of the region; those of Madagascar, Malawi, South Africa, Tanzania and Zimbabwe. Continental fragmentation has also given rise to the emplacement of kimberlite intrusives, the original source of the extensive diamond deposits of Angola, Botswana, Guinea, South Africa, Tanzania, and Zaire.

The most recent structural episode on the African continent was the formation of the African Rift which extends for over 2,000 miles from the Red Sea to Malawi. Along this massive complex fault, (and also because of associated volcanic events), are found many of Africa's known and undeveloped non-metallic mineral deposits, such as kaolin clays, bentonites, pozzolanas and fluorite. The Rift also contains large salt lakes, particularly in the north (Ethiopia, Kenya, Tanzania), from which a variety of industrial minerals (such as common salt, soda-ash and potash) can be extracted.

Mineral deposits created by erosional concentration or chemical decomposition include bauxite in Guinea; rutile and other heavy minerals in Madagascar, Mozambique and Sierra Leone; gold alluvials in southern Ethiopia and northern Zaire; and diamonds in Namibia.

All classes of mineral deposits are present in Africa and many are unique: the coastal diamonds of Namibia; the chromite, vanadium, and platinum of South Africa and Zimbabwe; and the copper-cobalt deposits of Zaire and Zambia. At the continental level the high-value minerals such as gold and diamonds have the most extensive distribution in the world. Other gemstones such as emeralds, rubies and sapphires, relative newcomers to the African scene, are also widely

distributed in East and Central Africa. From the overall framework of Africa and the considerable detailed knowledge of the geology and associated mineralization potential of most countries, there is little doubt that major economic deposits remain to be discovered. One or two, such as the Tenke and Fungerume copper deposits in Zaire and the Adola gold belt in Ethiopia, are already known and awaiting development.

Comparison of Similar Geological Terranes

Africa suffers from a large shortfall between geological potential and mineral development. This is directly related to insufficient exploration work. Most exploration is based on similarities of geological settings. Over the last decade in particular, the recognition of fundamental similarities between geological terranes and mineralization models has had a major effect on deposit discoveries.

For example, there are similarities between the Gweru greenstone belt of Zimbabwe, the Abitibi-Timmins-Kirkland Lake belt of Ontario, Canada, and the Ngayu and Kilo-Moto greenstone belts of Northern (Haute) Zaire. Cross-structures which play a major role in the location of the Canadian deposits (Destor-Porcupine, Pipestone and Larder Lake) have not been fully recognized in Zimbabwe or Zaire, although work on structural control and the Lily fault zone in Zimbabwe is on-going and the importance of the Mwembeshi Shear Zone is known. This lack of fundamental knowledge, notably in Zaire, is a direct result of the lack of exploration.

The figures in Table 2.2 demonstrate the relative lack of investment in two of the higher potential mining areas of Africa compared with a small segment of the Abitibi-Timmins-Kirkland Lake belt in Canada. Moreover, both the value and tonnage of the Timmins-Kirkland Lake belt production is related to the last thirty years, whereas estimated production from Haute Zaire is for the greater part of a century. Total gold reserves of the Abitibi belt is estimated at 3,000 mt, which at present prices (US\$370 per ounce) represents a potential reserve value for gold alone of US\$37,000 million. By comparison the known gold reserves of the Gweru area of Zimbabwe and Haute Zaire are about 100 mt each.

If one considers the surface area of potential geology, Table 2.2 selects just the western part of the Abitibi Belt which has about one third the aerial extent of the three selected areas in Haute Zaire. The total potential belt in Haute Zaire is upwards of 100,000 km². The concession held by the Zairian state company, Okimo, alone has an area of 42,000 km², more than twice that of the Abitibi-Timmins-Kirkland Lake area, and is only officially producing 0.5 metric tons per year gold. By comparison, Ecuador, where gold mining is in its infancy, produces 10 metric tons per year gold from an area of 1,000 km² within which no major mine has yet been developed.

Required Exploration Financing

From the regional geology and from comparisons of similar geological terranes, the geological potential of each country in Sub-Saharan Africa has been assessed (Annex 2). Estimates have also been made of the level of exploration which is considered justified. The assessments indicate that at minimum, a doubling of the present level of investment is warranted. Almost certainly, a quadrupling would be well justified. These estimates do not take into account detailed property assessment and reserve development work of either new properties or extensions of known mines.

Table 2.2 Comparison of Greenstone Belt Mineralization

	CANADA Abitibi-Timmins- Kirkland Lake	ZIMBABWE Gweru	ZAIRE Ngayu/Kilo-Moto
Surface area (Km ² prime geology)	18,000	12,000	50,000 ^(a)
Number of present and past mines	120	400	8 ^(b)
Value: past-present production (Cu/Zn/Au) (US\$ million) ^(c)	50,000	9,000	4,000 ^(d)
Number of advanced new mining projects	8	10	1
Value (US\$ million) ^(e) / present production per year gold only	525	40	20 ^(f)
Estimated exploration per year (US\$ million) ^(g)	180	5	0.5

(a) Relates only to selected known areas

(b) Number of worked areas. There are numerous alluvial workings.

(c) 1990 prices.

(d) Only gold produced.

(e) Gold at US\$370 per ounce.

(f) 6 official plus 14 unofficial (estimate).

(g) 1988

Source: World Bank staff estimates.

Sub-Saharan Africa is not a homogeneous region and the countries within it exhibit different levels and combinations of mining activity and experience, geological potential, infrastructure availability, and administrative capacity. These assessments are based on a subjective evaluation of these factors. If Africa is to see an acceleration of its mineral development, the level of exploration needs to be doubled to US\$250 million per year (compared with about US\$125 million per year in 1989). This would result in a five year expenditure of US\$1,250 million. It must be emphasized that this is a target level to be achieved by providing an enabling environment to attract private companies, not by increasing government exploration expenditures.

The proposed expenditure level although well below the level of investment needed to close the exploration gap with the rest of the world, is considered achievable if the right regulatory and economic adjustments are made. The optimum level of exploration investment is closer to US\$500 million per year. This is achievable early in the next century if adjustment actions are taken within the next three to five years. If immediate corrective action is not taken soon, the exploration financing gap will be even larger.

The country assessments show that Namibia, Zaire and Zimbabwe warrant a five year exploration (investment) program of more than US\$100 million each; seven countries US\$50-100 million each; and six countries US\$25-50 million each, Table 2.3 and Map (at end of publication). These assessments although based on geological potential, are subjective in that they also take into account the current political situation, infrastructure and level of mining sector development, including its administration. As an example, Angola, from only its geological potential would merit inclusion in "Category A" in Table 2.3.

In addition some countries with priority zones have been selected for the combination of geological evidence and known or indicated mineralization, but where exploration has been insufficient to develop the potential (listed in Category D in Table 2.3).

The geological assessments show that the mineral potential of Sub-Saharan Africa is not a limiting factor to mining development. The diversity of the resource base is well proved. The

Table 2.3 Priority Countries for Exploration Investment
(US\$ million per year over a five year period)

Category A US\$ > 20 million per year	Category B US\$10-20 million per year	Category C US\$5-10 million per year	Category D US\$2-5 million per year
Namibia Zaire Zimbabwe	Angola Botswana Ethiopia Ghana Mozambique Sudan Zambia	Burkina Faso Gabon Guinea Kenya Madagascar Tanzania	Burundi CAR Côte d'Ivoire Mali Nigeria Rwanda

current underdevelopment and stagnation of the mining industry in many of the region's countries can be directly linked to the lack of high-risk exploration investment. However, this proposed exploration agenda is closely linked with establishment of a clear mining development policy, a reduced role for state mining companies, and the creation of attractive conditions for private investors. As long as state companies continue to control mining centers and large tracts of prospective land, new exploration investment will be severely limited.

The current major sources of exploration financing in Africa are governments, multi-lateral agencies (such as UNDP and EEC), bilateral agencies (such as France, UK, Germany and Sweden), and local small-scale miners. The government sector in most African countries is poorly-equipped both technically and financially to carry out effective exploration, and prospectors and small-workers have limited capabilities. Only in a handful of instances (for example Burkina Faso, Burundi, Ethiopia and Mali) has multi-national and bilateral assistance been effective in finding important new reserves or orebodies.

To achieve a significant upturn in exploration, the region will need to encourage private investment from major international mining companies, a growing group of technically competent "juniors", venture capitalists, and joint-ventures between these groups. All those prepared to enter the mining scene in Sub-Saharan Africa and undertake productive work programs should be actively encouraged.

3

ATTRACTING THE INVESTOR

Investor Perceptions

The previous two chapters have outlined the potential importance of mining in Africa and confirmed the geological potential of the continent. The conclusions are that if Africa is to close the exploration gap with the rest of the world, exploration expenditure needs to increase by two to fourfold or more and that the only major source of such large amounts of risk capital is the international mining companies. State-controlled mining companies and local private investors simply do not have the expertise and quantities of capital required. International companies are also needed as potential investors in the generally under-performing state-controlled mining companies. Attracting private capital on this scale and overcoming the negative perceptions of Africa requires a major effort by African governments.

Mining is a highly competitive global industry and companies must be competitive from an international perspective if they are to survive and prosper. Most large mining companies and many smaller companies make global exploration and investment decisions. The 30 mining companies with the highest turnover in 1989 had a total turnover of about US\$60,000 million. These include Australian, Canadian, South African, European and American mining companies. All these companies have widespread global interests covering a range of minerals—have certain regional and product concentrations.

The major mining companies look for specific targets, almost without exception ore bodies with substantial potential lives. Such companies invest in basic grass-roots exploration. They have the necessary motivation, experience, knowledge and access to substantial capital resources. The top

thirty mining companies with the highest turnover in 1989 account for about US\$1,200 million in annual exploration expenditures. These are high risk equity funds for basic grass roots exploration and identification; investigation and proving up of new ore bodies. (They do not include funds for feasibility work). State mining enterprises in Africa typically spend less than one tenth of this amount on exploration.

Apart from the major international mining companies, there is a growing group of "junior" mining companies and venture capitalists. Joint-ventures between these different types of investors can also be considered. Such companies proliferate in USA, Canada, Australia and South Africa but are largely absent in Africa. The development of this "missing middle" is a critical aspect of expanding the mining sector in Africa.

Medium-sized and small private venture groups are generally less well capitalized but are willing to take higher risks and to find and develop smaller deposits. Many junior mining companies have excellent technical capabilities and have become a serious force in international mining.

To better understand the concerns and prerequisites of potential investors in African mining, an enterprise survey was sent to eighty international mining companies asking what influences their investment decisions in developing countries. Replies were received from forty six companies (not all complete) and data from forty were analyzed. The companies represent a spectrum of the industry from junior companies with modest exploration budgets of US\$1-2 million per year to the largest multi-nationals with budgets of US\$50-100 million per year. The respondents included nineteen North American companies, seven Australian, twelve European,

and one each from South Africa and Japan. In 1988, they had combined sales of US\$39,000 million, capital expenditures of US\$5,200 million, and exploration expenditures of US\$930 million. The ten companies with the largest exploration budgets accounted for US\$22,000 million in sales and US\$558 million of exploration expenditures. As back up to the discussion on exploration expenditures as a percentage of sales in Chapter 2, the ten largest companies with exploration budgets of US\$30-100 million per year spent 2 to 5 percent of sales and the fourteen smallest with budgets of US\$1-10 million per year, 3 to 9 percent of sales. Larger more mature companies normally spend a smaller proportion of their revenues on exploration (although a larger absolute figure) than young, small companies.

The responses to the questionnaire represent the perception of the respondents according to their knowledge and experience and when aggregated provide important information on the criteria for investing in Africa.

- *Mineral Potential and Infrastructure*

The primary criteria influencing activities are mineral potential and infrastructure. Two-thirds are willing to be among the first foreign companies to explore or develop projects if there are good prospects. Three-quarters operate broad exploration strategies and will consider mineral developments in any country.

- *Mining Rights and Fiscal Terms*

Given good geological prospects, a guarantee of mining rights before starting exploration is an essential pre-condition. Thereafter, a well established mining code, contractual stability, a guaranteed fiscal regime, profit repatriation, and access to foreign exchange, are critical factors. Accelerated depreciation and amortization and realistic exchange rates are important but less essential.

- *Ownership and Control*

Respondents are generally not prepared to work in countries with mandatory local

majority participation, either government or private. However, many see minority local participation and mandatory training of nationals as positive factors. Mandatory provision of social services, restrictions on negotiating wages, and limitations on expatriate personnel, are minor disincentives.

- *Political and Economic Risks*

There is more concern about corruption and political risk than macro-economic difficulties, since mining projects are export-oriented and more readily isolated from the national economy.

- *Risk Premiums*

As expected, higher risk premiums are required of investment projects in developing countries. Average return on equity required or targeted is 25 to 30 percent with a payback of 2 to 4 years as opposed to 20 percent and a payback of 5 to 6 years in industrialized countries.

- *Information Gaps*

A majority (72 percent) of respondents said that information is less readily available for countries in Africa than for countries in the Asia-Pacific region or Latin America. Information was least adequate regarding basic geological data and legislative, economic, and fiscal aspects, and most adequate on political environment, infrastructure, and general country background.

Within this broad consensus certain characterizations can be made tied to company size and nationality. The large companies with revenues of US\$1,000-3,000 million per year are the most opposed to government and local participation in projects. They would prefer to operate under an established mining code, rather than having to negotiate special provisions.

The medium-sized firms which in the sample are mostly American or Canadian with revenues of US\$100-1,000 million are the most varied.

They are prepared to tackle a wide range of project sizes and will accept a smaller risk premium than either the large or small companies.

The small companies will consider a more diverse set of factors when judging the potential of a mining project. They look for stability through fixed income tax and royalty regimes and involvement with governments and multi-lateral organizations such as the World Bank.

Among the nationality groups, the Europeans are the most sensitive to economic risk, paying particular attention to stable exchange rates, guaranteed tax regimes and currency convertibility. They are more prepared to negotiate one-off contracts and feel less threatened than other nationalities by government and local participation in their projects.

Little information could be gathered on Japanese and South African firms who could eventually become important players in Africa. The onset of political change in South Africa will have far reaching consequences for the region. South African mining companies have considerable mining strength and experience, and will probably become a major new source of exploration and development financing in other African countries which have significant mineral potential. Several South African mining houses initiated reconnaissance work in 1990 and 1991 for possible exploration and investment in various countries including Angola, Zaire, Zambia, Zimbabwe, Botswana, Namibia and Mozambique. Japanese firms are important consumers of mineral raw materials. Their support for new projects, through marketing contracts and project finance, can be a key element in the investment decision.

Implications for development

The survey shows that potential investors reach consensus on the critical issues but differ on the degree of importance of certain factors. Perceived mineral endowment, infrastructure, political stability, investment policies, and institutional framework, are all key determinants of exploration and investment decisions. There is general agreement that sound, stable policies could significantly reduce investor risk even in the face of political changes and corruption. Host governments need to understand and consider

these factors if they want to attract private mining capital. Valuable deposits may remain undeveloped and potentially rich areas unexplored because the local policy framework is poor.

Mining companies hesitate to invest in exploration and mine development in most developing countries because the perceived risks are much higher than in more advanced economies. Mining companies are prepared to accept the commercial and technical risks associated with exploration and mineral development. It is the "political" risks that concern them—the risks that countries may suddenly change the "rules of the game" especially in mining rights, taxation arrangements and access to foreign exchange. The risks facing investors may be put into three broad categories:

The ability to do business

These include the following risks related to the government establishing and honoring rules for doing business:

- obtaining exploration rights
- converting exploration rights into mining rights
- obtaining the right to import necessary goods and services
- having the right to export
- losing mining rights or legal title through undue termination or expropriation

They also include factors largely beyond direct government control such as local unrest or civil war which may interrupt or disrupt business.

The ability to control costs and be competitive

These include the risks that the government may:

- unilaterally change an agreed tax regime by adding new taxes or increasing tax rates
- impose price controls on inputs or outputs or both
- insist on the company undertaking marginal investments including smelting or refining which are not fully justified
- require excessive employment

- require infrastructure or community-social investments which were not originally agreed.

They also include the risks that costs may be increased by macro mismanagement (such as distorted exchange rates or runaway inflation) or by pressure for payoffs from officials to grant licenses and so on.

The ability to have access to foreign exchange

These include risks that the company will not be able to get adequate access to foreign exchange (at market rates) which is needed to obtain necessary imports, service debt, repatriate capital and pay dividends to foreign investors.

The investors considered country risk to be much lower in countries where there is a well demonstrated track record of the mining industry and the foreign mining investor. They believe that such countries better appreciate the concerns of investors and are more concerned to respond to them. Correspondingly investors perceive country risk to be greatest where there is little or no experience of commercial mining operations.

Countries wishing to attract high-risk private exploration and mineral development funds can reduce risk and increase predictability by:

- Establishing sound mining and investment codes with clear rules and guarantees regarding exploration and mining rights, majority ownership by the private investor, taxation, foreign exchange, escrow accounts, and profit and capital repatriation. It is essential that these rules be set out before exploration takes place.
- Assuring companies that they will have the right to mine following successful exploration, and that they will be permitted to transfer or trade exploration or mining licenses subject to explicit criteria.
- Enacting fiscal regimes comparable to those in other mining countries permitting a reasonable return on the investment. Without satisfactory tax and foreign exchange arrangements no investment will be forthcoming.

The lack of basic geological data and maps is a constraint to doing business in many African countries. This was especially so for small and medium enterprises who do not have the large geological capabilities and in-house knowledge of the large international companies.

Firms require first-hand information and need to have their data gathering efforts facilitated rather than complicated. Although interested international mining companies are generally aware of the information available, it is important that investment opportunities be presented to a broader spectrum of medium and junior companies. Countries should give high priority to the basic collection and compilation of geological and geophysical data.

Much basic geological information is available. Much exploration was undertaken before and in the early years of independence. The trouble is that the findings have not been well documented or collated and are therefore not readily available to interested potential investors. For many countries, material is available at different research institutes and locations in Europe and within the developing country itself. But there is no comprehensive index or system for gaining access to such information.

The quality of the information is variable. Since independence, considerable compilation efforts have been made by governments, often with international and bi-lateral assistance, and the resulting maps and publications provide useful information. However, these assistance programs were frequently shaped to the needs of the contributor rather than the receiver and the resulting information is published at a variety of scales and in vastly different formats. In some instances, information was not retained in the host country and is only available today from the assistance group. Major repositories of geological and geophysical information outside the region can be found with BRGM in France, the United Kingdom's British Geological Survey, Belgium's Musee Royal de l'Afrique in Tervuren, and the United Kingdom's Institute of African Geosciences at Leeds University. There is an urgent need to assemble such material at a single, readily accessible location and reinterpret it using modern technology.

Lessons from Other Countries

It is instructive to see how developing countries in other parts of the world attract mining investment. Important examples are Chile, Indonesia, and Papua New Guinea. Within Africa, Botswana and Ghana are moderately successful. These five developing countries demonstrate, in their different ways, the characteristics of an environment conducive to investment. These characteristics include an attitude which favors creation of wealth rather than controlling its production, a coherent body of laws and contractual regulations, and effective state institutions to support the mining sector.

These countries have been able to attract foreign mining investment at a rate at least commensurate with their perceived geological promise, and on terms and conditions generally favorable to the countries. Two outstanding successes are Chile and Papua New Guinea, which have attracted about US\$2,000 million and US\$1,000 million in new mining investments since 1985, with another US\$1,000 million or more in the pipeline for each. Chile has mobilized substantial investment in mining projects despite a record of nationalization. Indonesia has attracted about US\$1,000 million in the past five years, but future prospects are less certain following the introduction of harsher conditions in the latest draft agreements.

Botswana has attracted significant new investment in the development of its diamond industry and is now one of the few SSA countries where many international mining companies are exploring. Botswana's investment prospects are modest—US\$200-400 million in the next few years. Ghana has also managed to attract a modest but growing level of exploration and mining investment which has led to significant progress in gold production.

Details of the situation in each of the five countries are given in Annex 2. Key issues which determine success are:

- *Sound macro-economic and trade policies* with few restrictions or controls on mineral exports or needed imports of plant, equipment, services and supplies.

- *A legal framework* which adequately defines the investor's rights and obligations. This includes legal safeguards which set forth important details like operational control, marketing arrangements, dispute resolution, and so on.
- *Security of tenure* to give the investor assurance of being able to enjoy the fruits of success.
- *A fiscal package* which shares out equitably the rent of profitable production among the various parties concerned.
- *Guarantees of access to foreign exchange* at market rates for repayment of debts, capital and profit repatriation, and purchase of essential inputs.
- *Institutions which are well equipped*, able to respond to private investors in a professional and timely manner and which prevent or minimize corruption.

The five countries present a variety of approaches. The most successful, Chile, follows a strongly private-sector economic policy. Mining comes under the general foreign investment law with no special provisions and mining rights are as inalienable as property rights. In Indonesia and Papua New Guinea, all aspects of mining investment and operation are tightly regulated by the government through detailed agreements, namely a Contract of Work (CoW) in Indonesia and a Mining Development Agreement (MDA) in Papua New Guinea. Governments have discretion but it is limited. The Indonesian CoW specifies minimum exploration expenditures but leaves some flexibility regarding the eventual size of the project. In Papua New Guinea, a feasibility report is submitted and the project defined in considerable detail before the MDA is signed and the Mining License issued. The two African countries in the survey, Botswana and Ghana, both leave much discretion to the relevant government authorities but a long track record in Botswana's case and a lengthening one in Ghana's seem to show success in reducing uncertainties in the mining codes.

4

THE REGULATORY FRAMEWORK

Mining Codes

The previous chapter identified the importance of a satisfactory legal and regulatory framework if new mineral investment is to occur. This chapter outlines some key characteristics of a mining code which will meet the requirements of most investors while safeguarding the national interest. A country's mining code is the combination of statute law, regulations and agreements which governs the allocation, tenure and operation of mining rights. Separate legislation usually covers foreign investment, taxation, foreign exchange, labor, environmental and other regulatory matters.

The structure of the code will depend on the legal system in which it is embedded. There is a clear difference in legal tradition between francophone and anglophone Africa. The former uses a codified system; the latter both statute and common law. It is feasible to design a suitable modern mining code under the anglophone legal tradition as illustrated by those of Botswana (1976), Tanzania (1979), Malawi (1981), Mozambique (1986). There is one example so far under the francophone tradition, namely Madagascar (1990).

In many developing countries, the original colonial mining laws defined an "open" system in which anyone who had reached the age of majority, and was of sound mind, could acquire a statutory right to prospect and mine. This legislation was drawn up with the small-scale gold rush type operation then prevalent in mind and envisaged a negligible economic or technical role for government. The legislation was deficient in that it provided insufficient rights and obligations for both governments and investors, including inadequate security of tenure for investors willing to undertake the larger mining operations which

gradually became important in Africa. While these were important defects, in practice specific project agreements have been negotiated where there has been a promising prospect and political willingness on both sides, irrespective of the state of the law.

Although the mining codes of a few African countries were revised during the 1960s and 1970s, most are still not conducive to private investment. The majority have mining codes which rarely provide the type of rights and obligations needed to facilitate investments in modern circumstances. Potential investors and existing enterprises are often restricted by a range of laws (usually designed originally without reference to the mining sector), governing such matters as foreign currency, accounting standards, dividend payments, labor practices, foreign investment, import or export licenses, business registration and licensing. As a result, what investment in exploration and development does take place often requires exceedingly complex contract negotiations.

Modern mining codes intended to provide a framework for large-scale private investment rest on two guiding principles: the investor has the right to explore for and mine minerals in return for specific commitments which can be assessed and monitored; and the investor should have secure and long-term title to mining rights. The code should:

- Apply equally to all investors, public and private, domestic and foreign. And both the code and associated tax system should encourage efficient and orderly exploration and development.
- Clearly specify the ownership of mineral resources (for example national or provincial

ownership) and vest a single authority with the power to grant exploration and mining rights.

- Contain explicit criteria for the allocation of rights, the transition from exploration to mining rights, and allow exploration and mining rights to be transferable and saleable.
- Ensure that land under license is either actively explored and worked or relinquished. Minimum work requirements or surface rentals should be clearly specified.
- Prescribe procedures for settlement of disputes either in the courts or by arbitration. In the past, considerable difficulty has arisen over arrangements for the resolution of disputes but the emergence of satisfactory systems of international arbitration (ICSID, UNCITRAL or ICC) has largely removed this difficulty.

Much of the mining legislation enacted in African countries since independence envisages that "small-scale mining" will be reserved for citizens or local companies while "large-scale mining" will be the province of state mining corporations or large foreign mining companies. These policies tend to rule out the medium-scale enterprises of the kind that junior companies might develop. There is no good reason to create differential access to mineral rights for different classes of mining investor. A state mining enterprise should compete on the same terms as a privately-owned company, foreign on the same terms as national, large companies under the same broad rules as small ones. With the possible exception of special provisions for artisanal miners, new policy frameworks should eliminate distinctions between small and large-scale mining so as to encourage all potential interested parties.

In setting up a modern framework a choice must be made between detailed legislation with a minimum of ministerial discretion and specific project agreements backed by general legislation. Clarity in legislation and a minimum of ministerial discretion is the preferred option in a mature mining country where there is no difficulty in integrating non-mining legislation with a

comprehensive mining code. However in countries with little mining background and poor administrative capabilities, individual **Investment Agreements** will probably be more suitable, at least initially.

A mining code has an enabling, as well as a restricting, purpose. If all provisions are written along the lines "the Minister shall grant..." rather than "the Minister may grant..." then all the circumstances in which the particular grant is appropriate have to be envisaged in advance. There are areas, environmental protection is a good example, where rapidly changing international standards make it difficult to implement detailed legislation without frequent and impractical resort to the legislature for amendments. For this reason, general legislation with subsidiary specific regulations approved by decree that circumscribe ministerial discretion in reasonable and risk-reducing ways is preferable.

Depending on the circumstances of individual countries, reform of mining codes can probably be best achieved by gradual adjustment rather than an immediate shift to another fully-elaborated framework. Pending enactment of new mining codes, investment agreements should be negotiated. The process will only be meaningful if the investment agreement provides adequate assurances to investors regarding stable and fair terms and conditions. This may imply a significant and immediate policy shift for many countries. This process allows the development of a standard agreement, parts of which may subsequently be incorporated in general legislation. Alternatively, the standard agreement may later be promulgated as subsidiary legislation. This is the broad direction followed, with local variations, in Papua New Guinea and Ghana. Botswana and Mozambique are reviewing their general frameworks after some years of experience in negotiating investment agreements.

As the adjustment process is initiated, it will frequently become evident that reform of the mining code alone is insufficient. There is usually other legislation, especially concerning investment conditions, which impinges upon mining companies: regulations regarding foreign exchange, dividend control, business registration, labor and employment conditions. Coordination with the economic and administrative reforms effecting the non-mining sector will be needed.

There may also be cases of overlapping legislation. In Mozambique for example, it is legally possible for tax arrangements applicable to a mining project to be varied from standard taxation under any or all of the Mining Law, the Foreign Investment Law, and the Income Tax Law. Adequate co-ordination through the Council of Ministers has so far prevented conflicting grants of special arrangements but the risk remains.

Mineral Rights and Licenses

Aside from the USA, and a few exceptions elsewhere for specific minerals, most countries assume public ownership over minerals. Virtually all African states have used the approach which can be called "Permanent Sovereignty" over their mineral resources, in line with various United Nations resolutions in the early 1960s. This does not prevent the allocation of secure title to mining rights to private parties, nor does it imply that rights cannot be tradable. However, it does establish that the state can charge for access to the resource and has a legitimate interest in the manner of its exploitation.

Security and continuity of tenure of mineral rights is essential if there is to be sufficient incentive to undertake high-risk exploration with substantial work commitments and then marshal the large sums necessary for mine development. The investor needs to be assured of the right to the minerals and of the right to proceed from exploration to mining, provided pre-defined criteria are met. The mining license must be of sufficient duration and security to make the exploration and development commitment worthwhile.

It is most important that the power to grant mineral rights should reside with one authority and not be subject to overlapping or concurrent jurisdictions. In several African countries, lack of clear rules for allocation of mineral rights has hindered the orderly development of private sector mining. The main problems are corruption in the allocation process, absence of clear license area delineation and limitation, and disputes over claims.

Claim difficulties can be overcome by having all claim boundaries on north-south and east-west lines. This is simple and makes potentially

overlapping claims easy to detect. The size of the claim block should remain the decision of the explorer. To prevent monopolization of territory it may be necessary to limit the number of licenses that can be granted to any one company or group of related companies.

It is important to make sure that the regulations cause the mineral rights holder to actively explore or develop the land or return it so that it is accessible to others. This can be accomplished by some "use or lose" provision, for example by setting time periods for exploration work followed by mandatory relinquishment of a certain percentage of land or by having significant work requirements or land taxes that encourage the investor to release land not being actively explored.

There are two basic licenses: an **Exploration License** which gives the exclusive right to explore for and prove mineral deposits, and the **Mining License** which gives the exclusive right to extract minerals. Typically an exploration license might be for a three year period with one or two possible renewals for the same period (generally for a reduced area) whereas a mining license will be for twenty to thirty years with a similar renewal period. Some modern legislation (for example in Botswana and Tanzania) provides for non-exclusive **Reconnaissance Licenses** which permit access to a prospective area but provide no clearly defined rights to proceed to detailed exploration. This may be useful to investors making an initial inspection but is of little significance within the overall scheme and may add another layer of bureaucratic activity.

Although most mining codes have adopted this two license procedure, it is also possible to have a single license system, where the concession holder has the right to explore and to develop and operate a mine. Under such a scheme, the concession owner would have to prove to the satisfaction of the government that construction or production was happening after a certain period of time. Failure to comply would result in rapid escalation of license fees, effectively forcing the license holder to relinquish the concession or start production. Such a procedure requires arrangements to ensure adequate environmental protection measures.

In return for the exploration license the investor should be subject to minimum work

commitments or a surface rental (or possibly a combination of both). There is a choice to be made here. Conscientiously conducted work commitments provide more information for both company and government, and companies generally prefer to spend scarce resources on exploration rather than pay large license fees. Expenditure commitments also provide the strongest incentive for finding and proving deposits. Emphasis should be on a reasonable minimum expenditure commitment rather than detailed government intervention in the design of work programs. These are difficult to monitor and many African governments do not have the trained staff to do this effectively. Surface rentals are simple to administer, leave less scope for corruption, and may be useful in countries where monitoring capabilities are limited.

In addition to work commitments or surface rentals, it is essential that there also be land relinquishment requirements. After an initial phase of exploration (perhaps three or four years), 50 percent of the initial license area should be surrendered and effort on the remainder increased. A higher minimum expenditure commitment per block would be appropriate in renewal phases, together with a rise in the surface rental. However, the license holder should be permitted to declare a "Discovery Area" at any time, indicating that a potentially economic deposit has been identified and that a program of feasibility studies will be undertaken, so removing the relinquishment requirement applying to that area.

The mining code must specify work requirements or surface rentals (or both) for an exploration license and the conditions under which a Mining License will be granted. The mining license needs to be secure and exclusive for at least the envisaged life of the mine. Provided commitment of the investor is assured and fiscal arrangements are satisfactory, initial license periods of at least twenty years should be granted, with the possibility of renewals. The Mine Development Plan becomes the commitment in return for which a mining license is granted, but there has to be effective assurance of the company's freedom of operation within it and for variations in the light of changed circumstances.

Until confidence in the application of ministerial discretion in African countries is much

greater, few investors will be prepared to incur significant exploration expenditures without assurance that they can proceed to mine if they prove a deposit. Reconciliation of the interests of companies and governments over the award of mining licenses can be built around (a) the provision that only the Exploration License holder may be granted a Mining License, and (b) specifying the criteria under which an investor is entitled to a Mining License.

A prototype reconciliation exists in the Botswana Mines and Minerals Act of 1976 which provides that the holder of an exploration license who has established the existence of a commercial deposit has, in principle, a statutory right to a mining license. The investor must submit "a proposed program of mining operations" and the Minister is entitled to impose certain conditions; but if the program meets the criteria set out in the mining code, the license must be granted.

Elsewhere, in Tanzania and Malawi for example, the investor has recourse to the courts if the Minister's interpretation of the criteria appears unreasonable. Other mineral investment agreements provide for arbitration (usually international), and some for adjudication by a sole expert agreed between the parties. In all cases it is essential that the discretion of the Minister responsible be severely limited and a mechanism exist whereby his decision may be challenged.

The mining company should be able to assign its exploration and mining rights to another investor. The rights must be tradable. This is particularly important for the growing group of "junior" mining companies who having made a discovery may not always have the capital for development. For the project to proceed, they must be able to sell part of their interest. Tradability reduces risk to the investor and is conducive to efficient use of mineral resources. On both counts it increases revenue potential for governments.

In cases where governments negotiate agreements with mining investors, the provisions which take the most time and prove the most difficult to resolve relate to the retention of mining leases, and the suspension or termination of operations.

Special problems are created when a license holder wishes to defer or suspend operations. Governments have traditionally argued that, in

return for exclusive rights, a program of work should be carried out according to a defined timetable, varied only at the government's discretion. Companies argue that after completion of feasibility studies they should have the right to retain a prospect without immediately developing it, if market conditions are unattractive. Clauses can be included in investment agreements which allow periods of retention while objective economic returns cannot be met, and provided continuing optimization work is done. Such initial periods are sometimes followed by further periods in which the prospector retains first right of refusal if another party wishes to develop the deposit. Similar provisions can be incorporated for suspension of operations.

Termination provisions assume great importance when financing mining projects. Since the minerals belong to the state and mining rights are only granted for a defined period, there is a danger that the investor will have no asset by way of mining rights to pledge as security for finance. The government should only have the right to terminate a license on clearly specified criteria. The treatment of assets on termination must be spelt out, and in the event of a default by the company, adequate time allowed for remedy. In most circumstances such provisions will also be in the government's interest.

It is particularly important that mining companies have the right to market their product freely, unencumbered by obligations to sell to state marketing corporations or central banks, or to make contracts in an administratively-dictated way. Attempts to intervene or impose strictures on the manner of marketing activities will be a disincentive to potential investors. Governments should seek only to be assured that a fair market price is being received, under arms-length arrangements.

Companies should be obliged to keep government fully informed regularly regarding matters where the government has a reasonable interest and which are needed to monitor the investors performance of obligations. Such information would typically include production levels, employment, marketing arrangements, sales and financial performance, environmental performance and so on.

Model Agreements

In most developing countries, the rights and obligations agreed between the host government and investor are set out in an Investment Agreement. The main function of such agreements is to formalize the details of arrangements between state and company, fill any blanks or ambiguities in the applicable backing legislation, and provide safeguards for both the investor and the government which may not be adequately set forth in the law.

Such investment agreements can considerably reduce country-related risk for the investor while protecting the interests of the host government. An investment agreement is often an indispensable condition for foreign investors for major projects in developing countries where the risk of unilateral changes by the government to the investment rules is considered unduly high by investors because of political circumstances, lack of track record and economic difficulties.

The model agreement can also be used by government to ensure fair and appropriate conduct by investors. Some investors (generally a small minority) may attempt to reduce their tax obligations in the host country through underpricing mineral products sold to affiliate companies, over leveraging the projects financial structure, making excessive payments to parent or affiliated companies (for supplies, services and overhead charges) and making shareholder loans with above-market interest rates. The investment agreement can be used to ensure arms-length pricing, a satisfactory debt structure for the project and a reasonable limit for the level of tax deductible payments to associated companies.

Depending on the adequacy of environmental, health and safety regulations, the agreement can also be used to ensure the preparation and implementation of adequate social impact and environmental mitigation plans (including reclamation measures) and satisfactory health and safety operating standards. The agreement can include training and localization initiatives to increase the transfer of benefits to the host country and, especially, to the local community where the mine is developed.

There are three basic categories of investment agreements: those which substitute for statutory

law, those which supplement it, and those which implement it. The most common, and experience suggests the most desirable, are those which supplement general legislation. Agreements can bridge the jurisdiction gap between different ministries and state agencies and if the law is silent, ambiguous, or inappropriate from the investor's point of view on vital matters, can have sufficient legal standing to take precedence over earlier statutes.

The investment agreement can be an effective instrument for providing investors and lenders with assurances and guarantees that reduce the risk of sudden and unpredictable changes being made by the government after the investment takes place. It is also a suitable vehicle to address retention, suspension and termination issues. The agreement can provide assurances that taxation arrangements will be stable over the life of the mine or for a certain minimum period of mine life (possibly twenty years). However, it should not be used for negotiating the basic fiscal terms being applied to minerals projects. These should be established separately by the government. Chapter 5 discusses fiscal issues and outlines key elements of a possible tax package.

Many countries make use of a **Model Agreement** as a basis for negotiations. Such a document when read in conjunction with the statutory legislation enables investors to familiarize themselves with the legal, regulatory and fiscal environment in the country, form a clear picture of the way their "deal" would be structured, and review the guarantees and safeguards which would underpin it. Among the more important issues in such documents are:

- *Clarification of Mineral Rights:* The agreement should not duplicate the mineral rights in the mining law but may provide clarifications or assurances regarding specific issues such as size of exploration and production licenses, duration of rights over successive periods, extensions and required area relinquishments. It should clarify the right to proceed from exploration to mining, to sell or transfer rights without undue administrative discretion, retention, suspension and termination issues, and processing, marketing and export rights.
- *Obligations of the Titleholder:* work or expenditure obligations, infrastructure provision, employment, training, health, safety, reporting and accounting requirements and most importantly environmental obligations.
- *State Participation* (if applicable): whether optional or mandatory, timing, structure and level, financing terms of participation, and the allocation of managerial responsibility and operational control.
- *Fiscal Provisions:* license and area fees, royalties, and any exemptions of or liabilities to taxes and levies. Regular income taxes and withholding provisions stipulated in the country's tax legislation would normally not be included in Model Agreements. However, the agreement may provide assurances that taxation provisions will be stable over the life of the mine.
- *Financial Considerations:* foreign exchange arrangements, provisions for debt repayment, dividend and capital repatriation, escrow accounts, minimum debt equity ratios and criteria to regulate inter-company transfers such as charges for management services, and so on.
- *Legal Safeguards:* arrangements for settlement of disputes, force-majeure provisions, guarantees against improper termination or confiscation, including the use of international arbitration through agencies such as International Center for the Settlement of Investment Disputes (ICSID)

The draft model agreement represents only the government's first position with respect to a prospective investor. Some provisions are left blank, for example work obligations, and the government may well want to indicate flexibility with regard to non-critical provisions. Negotiating on a familiar model rather than company drafts is the most efficient use of scarce qualified government staff. No matter how many clauses are ultimately altered in negotiations, agreements reached from a model will all be similar which makes them easier to administer and monitor than diverse one-off contracts.

5

ECONOMIC AND FISCAL POLICY

Economic Policy

Sound economic and fiscal policy are also important prerequisites for mineral development. This chapter addresses the need for sound macro-economic and trade policy, a market-based foreign exchange regime, and taxation arrangements that are competitive and fair to both the government and the investors. For most developing countries, the major benefits to be derived from mineral development are tax revenues and foreign exchange receipts. Because of this, successful integration of mining policy with overall economic policy is important. However, mineral revenues do not represent a cure-all for a nation's economic ills.

Sound macro-economic and trade policies, and good governance in general, have a strong influence in shaping the performance of the mining sector. Inflation, exchange rate policies, government expenditure, and the balance of payment affect the mining industry just as they do the rest of the economy. Even though linkage to local industries is limited because mining products are exported and many of the inputs imported, the sector cannot be isolated. For example, local labor costs may account for 20 to 30 percent of operating costs. If high domestic inflation is not accompanied by devaluation of the local currency, labor and other local costs will rise on an international scale and financial performance will be squeezed.

Many developing countries face severe economic difficulties. Investors will probably be prepared to consider project possibilities where countries are making firm efforts to improve their economic management. However, they will almost certainly hold back from countries where

economic policies are considered ineffective. Most major mining projects tend to be capital intensive and their performance is highly dependent upon a satisfactory trade and foreign exchange regime.

Mining companies, especially in developing countries, need access to foreign markets to import necessary plant, equipment and consumables and to export their products. Investors become very cautious when dealing with a highly protected trade regime whose excessive restrictions or licensing requirements could put at risk their ability to export their products and obtain needed imports. A sound trade environment will include the unrestricted right to export, and firm assurances to import necessary plant, equipment and supplies.

Companies also need access to foreign exchange funds to pay for imports, service debts and, in the case of foreign investors, repatriate capital and dividends. While investors can partly protect themselves from such risks through the use of offshore accounts, they are very vulnerable to high local inflation which can erode their competitiveness and profitability unless offsetting exchange rate adjustments are made. A market-based exchange rate is thus essential. A sound foreign exchange regime will include a market based exchange rate and assured access to foreign exchange (at market rates).

At the sectoral level, economic policy should concentrate on enabling mining to maximize tax revenues over the long term (that is a 10 to 20 year period). It is usually preferable for the government to use mineral revenues to achieve its other economic and social aims rather than to force the mining industry to pursue these secondary objectives itself. Concentration on

maximizing tax revenues means the government has an interest in least-cost production. Mines should not be forced into downstream processing that would not be undertaken on normal commercial criteria. Encouragement of in-country downstream processing can actually cause income loss to the host country if domestic processing is more costly than the overseas alternative.

The same applies to local purchasing of supplies. Supplies should be purchased from the least-cost source, local or imported, provided the quality is equal. Mining license holders should certainly be encouraged to give preference to domestic suppliers who are competitive with their overseas counterparts. Tendering procedures should be open and understood and local businesses able to obtain assistance in making tenders.

Mining companies should not be obliged to use or be offered incentives to use employment-increasing techniques. Most of the large state-owned mining complexes in Africa were constructed when labor-intensive methods were prevalent. As these industries decline, or as re-investment takes place, the numbers employed will decline sharply. New mines will use predominantly capital-intensive methods and are unlikely to be such large employers. Instead of distorting decisions on choice of production methods, employment objectives will usually be best served by allowing existing and new mines to use optimal techniques and for government to use mineral revenues for employment creation elsewhere in the economy. These considerations do not exclude requirements for companies to provide extensive training for host country workers. They have a strong financial incentive to do so in view of the usually high cost of expatriate employees.

Maximizing government revenue over the long-term requires policies that promote investment in new mines and efficiently tax existing mines. This calls for a tax system that emphasizes profit-related taxes. Mining is a highly cyclical industry, well known for its price cycles of "boom and bust." The cyclical nature of international minerals prices has a direct impact on the selection of taxation mechanisms. Mining companies strongly prefer earnings-based taxes

rather than royalties because of wide fluctuations in their profitability.

Payment of royalties does not reflect the prevailing market conditions and thus acts as a disincentive to investment, whereas earnings-based taxes do not distort investment and production decisions. A mineral tax regime is outlined later in this chapter that attempts to encourage exploration, mine development and efficient operation. The proposed tax regime thus places strong emphasis on earnings-related taxes rather than royalties as the main instruments of mineral tax collection.

Since the proposed tax regime is based on profits and rents, government revenues will be liable to significant fluctuations as mineral prices vary. This can cause problems if the mineral industry provides a large component of public revenues. Fluctuations in mineral revenues should be dealt with by appropriate macro-economic policy measures, not by special taxes. Adoption of suitable macro-economic policies would normally be superior to a tax system that generates lower but more stable revenues. There may be exceptions but there can be no assurance that lower, more stable revenues will improve economic performance. Inefficient tax arrangements, however, will reduce mineral output and shorten mine lives.

A major contribution to economic stability will be made if public sector demand is kept stable. This will require accumulation of savings in good years to be run down in bad. The monetary effect can be neutralized by accumulation of savings in central bank deposits or acquisition of foreign financial assets. To do this effectively it is necessary to estimate the sustainable rate of public expenditure growth in real terms in the light of conservative forecasts of medium-term mineral prices. Medium-term trends (on, for example, a seven or ten year moving average) are more stable and forecasts are widely available from international agencies or private firms.

Tax Policy

As a general principle, all sectors of the economy should be subject to the same tax rules for investments to be made efficiently, that is,

investment decisions in different sectors of the economy should not be influenced by tax incentives or burdens that apply to one sector but not another. The tax regime should be non-discriminatory, applying equally to foreign and local companies, and to private and state-owned enterprises.

While the principle of investment neutrality across sectors is of fundamental importance to the economic rationality of a tax system, the basic characteristics of the mining industry must also be considered. Minerals are considered to have "rent," defined as the value of the product less all direct and indirect costs of production, including the minimum return to capital required to make an investor commit funds in the first place. (This definition allows for the possibility that some mines will never generate any rent, while some mines could generate a great deal). Mining is a very long-term high risk activity which in the African context will largely depend on investments by international mining companies rather than the domestic private sector.

Tax policy determines how a given amount of rent is to be divided between governments and investors. Taxation of this intrinsic value is frequently attempted through royalties or free government equity in the project. A few countries levy additional profits taxes, once a project has reached a specified rate of return, with the intention to capture a significant share of mineral rents.

When setting royalty rates, taking free equity or using additional profits taxes, a balance must be struck between the views of governments and companies. At one extreme is the view that all the extra value should accrue to the state as owner of the minerals, that is the government should receive all income over and above a pre-defined rate of return to the investor.

On the other extreme, it is argued that minerals have little or no value until they have been found and then delineated with a high degree of confidence. It is primarily through prospecting and exploration that mineral deposits are identified and through mining and processing that their full value is realized. Companies hold that whoever is responsible for finding minerals and giving them value, should receive most of the added value as part of the just reward for the risk involved.

Tax policy is also concerned with establishing conditions so that investment takes place and rent is created. The selection of tax instruments to be used, as well as the magnitude of the average and marginal rates of tax burden, will affect the pace, intensity, and efficiency of mineral development. This influences the magnitude of resource rent and the share which the resource-owning country can obtain. A resource-owning state should pursue policies that maximize investment and output over the long term (10-20 year period) while providing the government with a fair share of the rent created. The level of taxation should be as high as possible while still fostering efficient operation and providing an adequate incentive for exploration and investment.

Just as rent can be created, it can also be dissipated by technical and managerial errors in mine development, by an obligation to use a sub-economic transport route, and by taxation that encourages "high-grading" and thus permanent loss of otherwise economic reserves. Rent can be diverted to parties other than mining companies and governments by excessive wage demands, fraud or corruption, or excessive compensation claims by "traditional" landowners.

The total rent in a mineral deposit will vary according to its technical characteristics (such as reserves, grades) and physical factors (such as location, infrastructure). The fluctuation of mineral prices will also affect the distribution of rents over time. The uncertainty of costs and prices means rent actually generated may be higher or lower than initially expected. Sometimes it will be non-existent.

The magnitude of the rent also depends on the investors risk premiums. Since the rate of return is a component in the calculation of available rent, the lower the rate of return required by the investor, the higher the realizable rent.

Governments can reduce investor risk in a variety of ways. Investors face many risks relating to their ability to do business, to control costs and be competitive, and to obtain access to foreign exchange. Governments can reduce such risks by establishing clear mining development policies, sound institutional structures and capabilities, and explicit rules and regulations regarding the granting of licenses and the conduct of business.

Assurance of the stability of contract terms will lower the risk perceived by investors that terms may subsequently be altered if a project turns out to be especially profitable. If governments permit access to deposits on generous terms, only to impose onerous variations in taxes when high returns are generated, investors will anticipate such changes and increase their risk premiums accordingly. Resource rent available to be taxed will be reduced and some potentially economic deposits will not be developed.

Governments can reduce investor risk by emphasizing earnings-based taxes rather than royalties or input- and output-related taxes such as export taxes, import duties and fuel taxes. Tax collection mechanisms linked to inputs or outputs raise costs increasing the investors risks of absolute losses on a project. If taxation is likely in loss-making conditions, investors risk premiums will increase. By structuring the tax system to reduce the risk of taxation or royalties contributing to operating losses, governments should secure more investment and higher taxation over the life of the mine.

Since many projects typically have long lead times and are capital-intensive, investors are concerned to recover their capital as quickly as possible. Given that investors typically have much higher discount rates than governments, provision for accelerated depreciation can be advantageous for governments as a measure to reduce investors risks of failing to recover their investment. In contrast, tax holidays are to be avoided since they can encourage high grading and other undesirable practices, such as delays in needed expenditure in order to maximize income during the period of the tax holiday.

The maximum tax rate must be compatible with the efficiency of resource use, provide an adequate incentive to invest, and must be at least comparable with that in other countries. Common-sense suggests that a country's mining tax regime cannot move too far out of line with those prevailing in countries with close substitute deposits, or investment will be diverted. Countries wishing to attract investment from international mining companies must recognize that such capital will be attracted to the projects offering the highest returns.

The economic deterioration experienced in many developing countries, notably in Africa, has left a legacy of onerous and distorted indirect taxes and foreign exchange controls which, if imposed in full, would remove the incentive to invest altogether. Accordingly, special privileges or exemptions regarding taxes and foreign exchange regulations have become common. Such arrangements are probably necessary in the transition to a reformed economic system but are not justified by the nature of mining investment when economic conditions are less distorted.

If import duties are reasonable and non-discriminatory and currency convertibility applies to all activities, the need of governments to grant special conditions should be resisted on grounds of macro-economic management. Botswana and Papua New Guinea, for example, have adopted this approach without perceptibly deterring mineral investment. However, where indirect taxes are onerous, the mining sector, like all export sectors, should receive drawbacks or rebates so that it can compete on a comparable basis with producers abroad.

Although the magnitude of rent is subject to uncertainty, in theory it is feasible to design tax systems which accurately tax the true economic rent and maximize the share of revenues to the state while leaving the incentive to invest intact. The resource-owning government should aim to tax resource rent as it is realized rather than taxing it based on a forecast of revenues which subsequently may turn out to be wrong. If taxes would vary with market conditions in this way, tax arrangements would likely be stable since the government as resource-owner will be unable to alter them unilaterally without jeopardizing fresh investment.

A satisfactory mineral tax regime will reconcile the objectives of governments with those of mining investors. Governments should aim to minimize their own financial risks and outlays, encourage the maximum flow of new mining investment consistent with the economy's capacity for growth, obtain a fair share of the rent generated and thereby secure a flow of foreign exchange earnings and state revenues. Investors need to recover their exploration and development outlays with a satisfactory rate of return, repatriate dividends, and meet all debt and other

overseas obligations. They need to know in advance the financial terms on which they may develop a mine and be confident that those terms will not be changed.

The following general principles attempt to reconcile these objectives.

- Profit, dividend, and cash-flow taxes are more attractive to investors and will cause less distortion to investment and operating decisions than input or output-related taxes such as customs duties and royalties. The taxes chosen should be capable of effective imposition and administration and carry-forward of tax losses should be permitted.
- Mineral taxes should be consistent with domestic tax arrangements. However, if Africa is to attract investments from international mining companies, the tax regime must be comparable with tax terms offered by other countries seeking mineral investment.
- Mineral taxes should be fixed and stable over the long term.
- The tax regime should be non-discriminatory, applying equally to foreign and local investors, and to private and state-owned enterprises. There should be no discrimination between the right of foreign investors and the right of local investors to receive dividends.
- Double taxation and the sacrifice of tax revenue to foreign tax authorities should be minimized. Thus tax incentives should be given only to the extent that the benefit is not transferred to the investor's home country tax authorities.
- Arrangements for accelerated depreciation should be considered for the rapid recovery of exploration and development expenditures.
- If state participation on concessional terms is sought, it should be taken into account in design of the tax package. Such free equity reduces the return available to the investor.

The Tax Package

A satisfactory tax regime is essential. It needs to be designed to capture a fair share of the rent for the country, as compensation to the economy for the use of a material asset (the mineral deposit) while providing a reward to the investor commensurate with the risks involved. If taxation terms are not sufficiently attractive to the investor, exploration and investment will not take place. If they are too generous, there will be great internal pressures in the host country to modify them.

What is an appropriate tax burden in the African context? Investors will typically assess countries according to the degree of country-related risk and the mineral prospectivity. The most attractive countries will be those with excellent geological prospects and relatively low country risk. The least attractive countries will be those with high country risk and poor geological prospects.

Most African countries will fall into the category of medium to high country risk—especially compared to USA, Canada and Australia. Accordingly they will have to provide highly competitive tax packages and incentives to attract new high risk exploration and investment funds from international companies.

It is also necessary to ensure that the structure of the tax system, as distinct from the tax burden, is suitably designed for the conditions of Sub-Saharan Africa. The tax package outlined in the rest of this Chapter is representative of the tax conditions needed to attract investors to African countries. It allows rapid recovery of initial investor outlays and under most conditions will tax a mine only at normal business rates plus a royalty at a reasonable level. To promote contract stability, tax measures that permit governments to share additionally in projects with especially high returns may have a limited use.

The tax arrangements proposed are contingent upon investors having the right to hold mineral sales proceeds in offshore escrow accounts and to dispose of them freely. Any restriction on foreign currency availability and transferability immediately increases investor risk and makes untenable a tax package based on the assumption of unrestricted use of sales proceeds.

Administrative costs, political difficulties over individual projects, and the investor's perception of risk will be reduced by having established terms, preferably contained in general legislation, applicable to all mining projects. This is the approach adopted by most of the countries with successful mineral policies.

Because of the differing perceived risks in individual prospects, it may be desirable to leave some elements of the overall economic package negotiable. Examples of this might be the terms of state participation or the extent of government provision of infrastructure. Over time, as country risk is reduced, or promising ore bodies are discovered, a country may consider increasing the tax burden for new mining operations, although leaving existing mining agreements unchanged.

Royalties

Mineral legislation in most countries makes provision for a royalty or production payment to be levied on the value of minerals extracted. However, when royalties are fixed at levels which do not properly take into account the cost of mining, they will act as a deterrent to investors and may result in sub-optimal investment and operating decisions.

A royalty in the range of one to two percent of ex-mine value should not result in significant distortions. Larger royalties, however, may raise the cut-off grade for the mine (that is, the minimum ore grade which is viable for mining), with the result that the life of the mine is greatly reduced. International mining companies have frequently maintained that excessively high royalties are a serious detriment to the investment decision. But governments have normally felt—and most companies have recognized—the political need for imposing modest royalties which tend to provide early fiscal revenue and some payment whenever mines are producing.

Given the importance attached to the level of royalty payments by both governments and international mining companies, careful studies may be needed to determine the appropriate royalty. Such a royalty—which does not unduly deter investors but which also satisfies the fiscal needs of the government—depends on the expected cost of mining, the indirect taxes applicable to the early stages of operations, the

effect of depreciation provisions in postponing or advancing normal corporate taxes, and whether or not other taxes on mineral are also being applied.

Corporate Income Tax and Dividend Withholding Tax

The basic principle is that Income Tax should be the same as elsewhere in the host country. However, to be competitive, the combined rate of Income Tax and (if applicable) Dividend Withholding Tax should not be significantly higher than in other mining countries, where effective taxation of corporate profits is typically in the range of 35 to 45 percent. Carry-forward of tax losses should also be permitted.

A question arises of how to assess tax where an operating company explores for and develops a second mine. With assessment on a company basis, exploration and development costs of a second mine could be offset against income from the first. However, assessment on a project basis will prevent this offset. A balance has to be struck between the incentive to exploration and development (and the discrimination in favor of existing operators which company assessment affords) and the political and economic problems that might be created by an extended period of revenue loss. Since there is a need to provide a strong incentive to exploration in Africa, company assessment is probably appropriate for exploration expenditures. But development expenditure should only be deductible against the income of the project for which it is incurred, otherwise the state will be subsidizing mine development.

Depreciation and Amortization

Large mining projects typically take longer to complete and longer to earn revenue than other investments. They also usually have very large capital requirements and thus carry debt obligations. Some form of tax relief in early years which makes debt repayment easier and speeds recovery of the investment considerably reduces risk and increases the incentive to invest. Accelerated depreciation allowances alter the timing of tax payments rather than the amount. The postponement of tax receipts may be outweighed by increased future benefits if the allowances result in greater investment and higher

tax payments than would have otherwise occurred. A most important consideration for an investor, is to have all relevant expenditure taken into account in calculating the capital base for depreciation.

Exploration expenditures should be amortizable at 100 percent in the first year and subsequent exploration expenditures within the mining license area expensed in the year in which they occur. Capital assets and intangible development expenditure should be depreciated over ten years or the estimated life of mine, whichever is the less. There should be an option to take accelerated depreciation for calculation of corporate income taxes during the first four or five years of production, subject to a maximum limit of 20 to 25 percent of the initial capital investment in any one year (to give a maximum total of 100 percent over the four or five year period).

Import Duties

The economies of many Sub-Saharan African countries remain severely distorted through overvalued exchange rates, inward-looking trade policies, and high tariff barriers. In such cases special temporary measures may be needed to counter-balance the effects of severe distortions. Export industries such as mining should be able to compete on a comparable basis with producers abroad.

There are two good reasons to reduce or exempt mining, as well as other export sectors, from import duties and related taxes on capital equipment and supplies, as long as distortions are present. First, such duties and taxes greatly increase investor risk since they raise total outlays on exploration and development, and exemption for mining is unlikely to unbalance the rest of the economy. Second, just as high levels of subsidies result in countries exporting subsidies, high levels of indirect taxes on export industries result in a country "exporting taxes" which reduce competitiveness. A functioning duty draw-back scheme for all export sectors would make special exemptions of mining unnecessary.

Other taxes on domestic business such as capital gains, withholding taxes on certain payments for services, stamp duties, should be reduced or exempted where levied at excessive

rates or in a manner that prevents them being credited against home country taxation.

Additional Profits Tax

A number of countries have introduced an "Additional Profits Tax" (APT) as part of their mineral taxation regime. The APT is typically a cash-flow tax designed to increase the marginal rate of tax on projects with very high rates of return. It is a mechanism for capturing economic rent for the government and is considered an efficient tax because it is only due on realized profits and does not take effect unless the enterprise has reached a pre-determined rate of return.

But many mining companies consider an APT as a major disincentive to investment. They must undertake many exploration projects to find a promising ore-body. They look to the high profits of a successful mining project to compensate the losses of unsuccessful exploration efforts. High profits in good years are also considered the necessary insurance in a risky business which all too often can see several loss-making years in a row. An APT with the threshold rate of return set too low or the additional tax rate set too high may remove this insurance and it is impracticable to envision a system whereby government would repay "excess profits" taxed in good years when the rate of return falls below the projected or required level in bad years.

Since Sub-Saharan Africa is perceived by international mining companies as a difficult and high-risk area to work in, countries of the region wishing to attract new mining investment need to assess whether they can afford to introduce an APT because of its deterrent effect on most potential investors. An APT should only be considered by countries with a well established mining sector track record, good proven mineral potential or established quality projects.

State Participation

Free or concessional equity is an alternative mechanism for capturing economic rent. Governments frequently wish to be equity partners in mining projects, both as a means of

participating in the mineral wealth of their country, and because they need assurance that the enterprise is being run with the interests of the nation in mind. Governments believe that they can gain additional revenue through dividend payments, and even if they are not the managing partner, board representation helps to allay political suspicions that the mine is being operated purely for the benefit of the private investor. Some investors consider that some type of minority state participation provides additional assurance against political risk.

The financial objectives of governments do not require state participation. But minority state participation, or even 51 percent majority, is still official policy in many countries. However, experience suggests that ownership is not an effective mechanism for capturing economic rent. Guinea has followed a policy in recent years of taking up to 50 percent free equity in new projects, but has seen no dividends. Such a policy can result in investors under-capitalizing and over-leveraging the enterprises, and in rent

being transferred by other mechanisms such as shareholder loans and parent company management charges.

Even where enterprises are highly profitable, dividend payments may be modest if funds are needed for capital expenditures, debt repayments or incremented working capital. In difficult times, shareholders may be called upon to provide cash to the enterprise or to guarantee new loans. A well designed tax system is a rent collection mechanism superior to government equity. If the purpose is board representation to increase transparency, this can be obtained without the need for the government to have a financial stake in the enterprise.

If it is necessary or desirable to include state participation this can be achieved by the state purchasing its interest, or by receiving concessional participation in return for changes in other elements of the tax regime. A free issue of equity to government is financially the equivalent to a higher rate of income tax and therefore the share of cash flow that can be taken by other kinds of taxes should be reduced.

6

INSTITUTIONAL REFORM

The Five Core Institutions

Present Status

The previous two chapters outlined aspects of the regulatory framework and economic and fiscal policy which could provide the environment to support new exploration activities and mining investment. However, policy reform will probably be ineffective unless it is supported by institutions competent to implement the legislation honestly and consistently.

Serious investors look to do business with a government in an orderly and punctual way. If contracts are to be negotiated and investment mobilized, institutions will need to respond professionally. Long delays or sudden changes in the "rules of the game" will send investors elsewhere. This chapter proposes an institutional framework for the sector, addresses the reform of state mining enterprises and outlines institutions to regularize artisanal mining.

The efficacy of the government institutions which regulate the mining sector in Sub-Saharan Africa is varied but generally weak. There are few examples of adequately staffed or effectively run mining sector administrations. State dominance and control of mineral production has resulted in a lack of attention to the administrative institutions. The Ministry of Mines, Geological Survey, and other mining agencies in most countries have suffered reductions in funding and can no longer perform their functions effectively. Buildings and facilities are poor and budgets insufficient to maintain and operate equipment and vehicles. Staff are often grossly underpaid which discourages work and provides fertile ground for corruption.

In countries such as Zambia and Zaire where the state mining companies are dominant in the

economy, the mining ministries have limited capabilities and insufficient political standing to effectively supervise them. In countries with a significant private mining sector, the mining ministries tend to take a back-seat to more influential ministries such as finance or planning. As a result, government departments, statutory bodies, state-owned enterprises, and local governments have frequently become obstacles to effective policy reform and new commercial endeavor.

To administer new policies some governments appointed special committees or created quasi-governmental institutions such as the Minerals Commission in Ghana. Such approaches have merit under current circumstances, but the core problem of rebuilding good administrative capacity remains. The institutions which regulate and administer the mining sector need to be rehabilitated and strengthened if the policy changes proposed in this report are to be successful. In most African countries this will require a change in institutional emphasis from the role of government as mining company owner and operator to government as mining sector regulator, promotor, and administrator.

What is required is a small number of adequately equipped and funded institutions with narrowly defined roles, professional staff, and clearly defined decision-making authorities. In countries where mining is (or could become) an important economic sector, an effective institutional framework would comprise five main building blocks: a Ministry of Mines, a Department of Mines, a Geological Survey, a Mineral Promotion Agency, and an Environmental Office. In such countries the priority is reconstruction of the Ministry of Mines and Geological Survey to carry out the core regulatory and promotional tasks. In countries

with little mining tradition, temporary administrative devices will have an important part to play until permanent institutional arrangements are established.

The tasks outlined for these five institutions should be narrowly focused and should exclude many activities currently undertaken or attempted. Most notably these institutions should have no direct involvement in production and commercial activities.

The Ministry of Mines

The Ministry of Mines should be responsible for broad policy direction, coordination with other ministries, organizing and leading negotiations of mining agreements, and supervising mining sector agencies. The Ministry of Mines should be the channel through which investors deal with the government regarding detailed technical, legal, and economic matters when preparing projects and negotiating agreements. The scope for investors to negotiate special provisions through other government agencies should be strictly limited as this creates uncertainty and provides opportunities for corruption.

Sound administration and regulation of the mining sector requires considerable inter-agency collaboration. The Ministry of Mines needs to establish effective coordination with other ministries, especially Finance for fiscal and financial arrangements, Justice regarding legal and regulatory matters regarding environmental protection issues. The physical aspects of projects will require close coordination with the ministries responsible for land, housing, water, transport, and local government, and the Ministry of Mines will need to establish close liaison with major public utilities such as power, telecommunications and railways.

Effective inter-agency coordination on this scale depends on the availability of key skills in other ministries. For example, the Ministry of Finance must be able to provide finance and tax inputs to negotiations and the Ministry of Justice must have lawyers with experience of commercial law and contract negotiation. These skills are not required solely for the mineral sector but the mineral sector would be in trouble if they were absent. Where support from other ministries and agencies is not forthcoming, there is a strong

temptation to accumulate skills not directly related to mineral sector needs within the Ministry of Mines. Since the public sector suffers severe skill shortages in many African countries, such duplication should be avoided especially in countries with small or minimal mining industries.

A key function for the Ministry of Mines in many countries will be to organize and coordinate the review and negotiation of exploration and/or mining project development agreements. In such cases, the Ministry of Mines must have a clear mandate for leading the negotiations and there must be explicit criteria governing which agreements may be approved by the minister and which require cabinet, parliamentary or presidential approval. Negotiations will be conducted most effectively where the concerned officials have the necessary framework and scope to negotiate an agreement and are not constrained by lack of authority or information.

Negotiations would normally be led by the Ministry of Mines and include, among others, representatives of the Ministries of Justice, Finance and where appropriate, the Office of the President. Botswana's Minerals Policy Committee operates along these lines for both policy advice and negotiations. Other African countries have adopted different procedures. In Tanzania and Mozambique, for example, principal responsibility lies with the Minister of Mines, who is autonomous under the mining law, but in practice, major agreements are taken for approval to the cabinet.

Complications can arise where agreements must be finally approved by ministers who have not been party to their negotiation. This is particularly so regarding financial matters. In Botswana, the Finance Ministry is directly involved at all stages but in Tanzania and Mozambique, the Ministry of Mines presents the rest of government with a package already negotiated between itself and the company. There is a danger of the Ministry of Mines being perceived as the agent of the companies rather than as an independent administrator of government policy.

The best way to overcome this problem is to ensure that the core negotiating team includes representatives of other key ministries and to develop standard contract terms especially regarding fiscal terms. Negotiations should

become more streamlined if key ministries outside the Ministry of Mines are directly involved at all stages.

Another key task of the Ministry of Mines in many African countries will be to support the partial or total privatization of state mining companies.

The Department of Mines

The Department of Mines should normally be a sub-unit within the Ministry of Mines. Core duties would be licensing and administration of exploration and mining rights, monitoring compliance with work or expenditure requirements, and health and safety. Other duties might include project coordination assistance to companies and compilation of production statistics and general industry information.

Successful implementation of these duties will require development with the Geological Survey of a database of mining licenses. The database should include their status, location, fees and dues paid, work requirements, timetables for reports, and relinquishment dates. There should also be procedures for integrating information submitted by companies with the Geological Survey's separate database of geological information.

The Department of Mines would be responsible for overseeing artisanal mining activity and providing appropriate technical assistance. This will be a substantial role in countries with significant artisanal mining sectors.

The Geological Survey

The Geological Survey should be a separate, independent government agency under the general supervision of the Ministry of Mines. Its main role should be mineral reconnaissance, geological mapping, publication and dissemination of maps, and compilation of a modern and accessible geological and exploration database. It should be responsive to the needs of investors for geological data and maps.

The Survey should not undertake any detailed exploration or feasibility work with the possible exception of support to artisanal miners. Nor should governments finance or undertake detailed mineral exploration and evaluation programs.

Prospecting and exploration should be left to the private sector which the Survey can best assist by undertaking basic geological mapping and data assembly to identify prospective areas or mineral prospects for more detailed work. A core staff sufficient for routine investigation work only should be maintained and additional staff should be contracted as required.

Production of a database with existing data and the digitization of all reliable information is essential. Rigorous re-evaluation using modern technology will then be possible. A wealth of knowledge has been generated on the mineral potential of Africa, but there has been an almost complete lack of the financial resources and technical capacity to effectively assemble and use this information. Computer technology now readily permits the processing and evaluation of different data sets, geology with geophysics, geology and geophysics with chemical data and so on. Basic fieldwork should be complementary to this. It is of little use to continue data gathering if the results are never assembled in a usable format. Geological surveys should develop sound training programs with adequate budgets and, for all new technical assistance projects, host governments and donors should ensure that information is produced in both hard-copy and digitized format.

Mineral Promotion Agency

The Mineral Promotion Agency should be a small independent government agency which acts as a key point of contact for prospective investors, especially those with little knowledge of the country concerned. It would have no decision making authority and is not envisaged as a "one-stop shop" under which companies would seek all necessary approvals and make all required reports. It should be purely an introductory and facilitating agency.

In a country with a strong mining tradition and a good legal and administrative framework, a Mineral Promotion Agency may either not be necessary or could be a small office within the Ministry of Mines. However, in countries with good geological potential and little mining experience, such an agency should be able to attract new investment and to do this an

independent office will probably prove more effective.

The Mineral Promotion Agency should do everything possible to smooth the path of the private investor. This would include providing good maps and attractive documentation on prospects (in conjunction with the Geological Survey), and providing a clear account of the regulatory and economic framework in the country. The agency should provide guidance on general legislation and taxation terms, procedures for obtaining exploration and mining licenses, availability of ground, potential prospects and so on. Agency personnel should arrange as required, introductions to ministries, state agencies, contractors and suppliers.

Environmental Office

The Environmental Office is the agency designated to monitor the environmental performance of the mining sector. Its main tasks will include setting environmental standards, monitoring exploration and mining operations, enforcing compliance with established standards, and reviewing environmental assessments for new projects.

To avoid conflict of interest it should preferably report to a central Environmental Protection Agency (EPA) responsible for national environmental policy rather than the Ministry of Mines. Sectoral and/or regional offices of the EPA, supported by environmental specialists located in the Ministry of Mines, would supervise compliance with regulations. However, as an interim measure in countries with strong mining industries which currently lack a central environmental office or ministry, the Environmental Office could be a unit of the Department of Mines.

Institutional Capabilities and Skill Development

While one or two African countries are starting to establish the institutional capability to deal with private investors, the majority of countries do not have such capabilities and are at a clear disadvantage in dealing with international mining companies. In such cases, governments need to organize small teams of competent

officials, often representing all interested government offices and ministries, to prepare documentation and negotiate agreements. In many cases, technical assistance and support from institutions such as the Commonwealth Secretariat, the United Nations Department of Economic and Social Development and The World Bank can be made available.

At the same time, a major effort is required to enhance mining-related administrative skills for all the relevant institutions. The lack of skills and exposure to the negotiation and operation of mining business in the rest of the world makes many government representatives difficult working partners for interested investors. For the foreseeable future, a significant proportion of government budget to mining-related institutions should be allocated to manpower training.

Skill development has tended to concentrate on technical education in geology, mining engineering, and related disciplines. University and other tertiary-level facilities in these subjects exist in some African countries, and foreign aid is extensively used for scholarships in these fields abroad. But skill formation for regulatory functions has been much less effective. Most African countries have difficulty fielding mining lawyers, contract negotiators, financial analysts, mineral tax specialists, and public administrators experienced in mining law.

Technically qualified nationals will be required by a growing private sector, and the growth of private sector mining will stimulate demand for technical courses. Many private mining companies already run substantial training programs both for their own benefit in developing countries and for the country at large. Where this does not yet occur, private companies should be encouraged to contribute to national skill formation by contractual obligations for training programs, minimum training expenditure provisions, special tax allowances for training expenditures, and secondment of personnel between companies and government. Chambers of Mines and similar organizations can guide the development of education in minerals and can assist with funding.

The tendency of the private sector to attract skilled personnel from the public sector is frequently lamented. But there are great potential benefits in such mobility and governments should

expect and encourage transfer of manpower from public institutions to the private sector to generate the in-country capability. The public sector should concentrate on developing and retaining those skills essential to public administration of mining policy, leaving the private sector to manage production. This requires that essential civil servants at all levels be paid adequately. Scholarships should not be conditioned on public service.

Reform of State Mining Companies

An immediate task facing governments will be to organize and supervise privatization of state mining companies. Private investors are needed as majority partners in existing state-controlled mining companies if these are to reach their

potential. There is an increasing recognition that state-controlled enterprises are less successful than their privately-controlled counterparts, principally because a state-controlled company is by its nature part of the government. This means it is subject, directly or indirectly, to all the political and economic pressures facing the government of the day. This is true to different degrees of state-controlled companies worldwide.

Some key differences between privately-owned and state-owned mining enterprises are presented in the company profiles in Figure 6.1. Whereas the generation of profits is the principal objective of the privately-controlled company, the state-controlled company is expected to fulfill multiple objectives of which generation of profits is only one. Objectives such as providing employment and foreign exchange often conflict with this.

Figure 6.1. Company Profiles

ELEMENT/FACTOR	PRIVATELY-OWNED	STATE-OWNED
Ownership	Group of private/institutional investors, shareholders	Government
Owner's objective	To have a pool of capital managed for the benefit of the shareholders. Enhancing the shareholders value	To reap the maximum benefit from the non-renewable natural resource, considered a national patrimony
Company's objective	One prime objective: maximize profits	Multiple (sometimes conflicting) objectives: • pursuit of profits • generation of employment • regional development • generation of revenues, foreign exchange
Company supervision	Independent board of directors; directors appointed on the basis of merit	Board of Directors. Majority of Board members part of government structure. Independence issue. Often political appointments
Company cash-flow distribution	Dictated by the needs of the business. Ultimate decision/approval by Board of Directors	Not only dictated by the needs of the business, board has limited autonomy.
Chief executive officer and management	Selected, hired and fired based on performance	In principle same, however often political interference
Organizational structure management autonomy	Often decentralized, resulting in flexibility, delegation of authority. To a large degree, autonomy of management	Often centralized resulting in lack of flexibility, limited delegation of authority, and limited autonomy of management
Management focus	Medium to long term: • management of core activities, metal mining and processing. • complementary services/ inputs are procured or contracted	Short to medium term: • management of a wide range of core and associated activities such as health, education, townsites.

There are also important differences with respect to supervision and cash-flow distribution. Both types of companies are supervised by a board of directors but in a state-controlled company, board members are often appointed on grounds of political merit and these members are subject to political pressures. Cash flow distribution may be, and often is, decided by other needs in the economy. In private companies, the board members are generally appointed for their commercial talents and the needs of the business generally dictate how much is distributed to shareholders and how much is retained for capital expenditure.

Another difference is that privately-controlled companies are free to hire and fire on performance, whereas state-controlled companies frequently have maintenance of employment as one of their objectives and need political authority to layoff excess employees. The relationship between a privately-controlled company and its host country is also typically well-defined. In many cases, privately-controlled companies are sheltered from unwarranted government intervention by an investment agreement which contains specific provisions for that purpose. Furthermore as indicated in Figure 6.2, private

companies are commonly part of a larger, outward-looking organization which values and maintains contacts with the outside world, whereas state-controlled companies tend to be embedded in the government's administrative structure. This results in a domestic focus with limited attention being paid to international developments.

In sum, different organizational structures, management autonomy, and focus, give privately-controlled companies an edge in responding to changes. It is not surprising that they are more cost-efficient and productive than their state-controlled counterparts.

If state mining companies are to operate efficiently, reforms are needed to enable them to operate more like private sector enterprises. Two broad approaches exist. One is reform from the inside, that is commercialization. This typically involves setting clear commercial goals, introducing firm budget constraints, and providing increased accountability and autonomy for managers with clear rewards and sanctions limited to performance. This approach requires a high degree of government commitment and discipline to be effective.

Figure 6.2. Company - Direct Environment - Interface

ELEMENT/FACTOR	PRIVATELY-OWNED	INTERFACE
Provision of <ul style="list-style-type: none"> • Infrastructure • Health care • Education 	Clear, well defined agreements Who does what	Not well defined. Company often ends up doing and paying
Relation with other Government institutions such Central Bank, other parastatals	Arms length, contractual or per agreement. Formal	Often blurred relationships. Informal
Access to proceeds	Company will insist on access	Often limited access
Access to capital markets	Access to public debt and equity markets	No or limited access to capital markets
Access to new technology	International orientation, often part of a larger international group. Emphasis on technology transfer	Domestic orientation not part of a larger international group. Limited access to new technology

The alternative is total or partial privatization with the strategic and operational control of the company placed in the hands of a technically and financially qualified private sector partner (or partners) who have a major stake in the successful performance of the company. This approach typically involves a more complex process than commercialization and may require the involvement of external specialists. Both options require achievement of the same fundamental objectives.

- Decisions must be made on commercial not political criteria.
- The companies must be subject to the same regulatory and tax codes as private enterprise. They should not be subject to excessive taxes.
- Senior management appointments should be based on merit and experience.
- Special treatment such as subsidies or privileged access to mining rights should be avoided.

The prospects for increased commercialization and arms-length operations of parastatal mining companies in Africa are poor. There are a few examples of public mining companies elsewhere in the world, for example, Codelco in Chile, which have become successful at running commercial operations. However, in Chile there are fundamental differences in the role and power of the state. These have included the setting up of an independent legislature, central bank, and regulatory bodies, and the development of stake holders prepared and capable of defending the new arrangements. These conditions are rarely found in Africa.

Attempts at commercialization of public entities in Africa have been distinctly discouraging. Most African countries are characterized by serious macro-economic, financial and social problems; limited, often ineffective, and corrupt administrations already struggling to implement reform programs; and a fragmented society with a longstanding political focus on wealth distribution instead of wealth generation. Too many conflicting interests must be resolved for commercialization to be a success,

and no amount of financial engineering is likely to overcome this overnight.

Experience of management contracts as an intermediate way of pushing commercialization shows only limited success. The contractor has not enough at stake to operate freely and remains dependent on the owner.

Given the political and social realities of most African countries today, the reform of mining parastatals will require a partial or complete privatization so that management and operational control of the company is given over to a private stockholder or stockholders. Privatization does not require the management of the company to prepare and implement a plan which would almost certainly contain elements against its own interests. Indeed, privatization may never be realized if the process is placed in the hands of officials of the parastatal company concerned. Instead, it requires the government, as owner of the company, to make policy decisions within its normal political realm.

Although preparation of a detailed plan will require the assistance of consultants with experience in both mining and privatization, establishment of the legal, financial, and investment conditions remains the sole prerogative of the government. Prerequisites for successful privatization include clear agreements on the overall regulatory and fiscal framework for the mining sector, specific understandings regarding employment reductions, financial liabilities and the treatment of pre-existing environmental problems.

For the very large state mining conglomerates, a staged approach could be adopted. Initially, all non-mining-related businesses would be privatized including to the extent possible, support activities. For example, health and social services now provided by mining companies would be transferred to government. Care must be taken, to ensure that an adequate level of service will be maintained.

Any new mining investments would only be undertaken under joint-venture agreements where the private partner is majority owner and manager. Finally, core mining activities would be privatized by soliciting bids from interested investors followed by direct negotiations between the investors and the government. The role of the interested private investor is to negotiate the conditions for a successful venture and provide the managerial and technical skills and capital

required to make it happen. Outside consultants can assist both sides to reach an equitable arrangement.

World Bank experience of privatization and divestment activities in other sectors has taught some lessons which should be equally applicable in the mining sector. A strong regulatory capacity and sound regulatory framework for the sector are essential pre-conditions for privatization. The primary objective should be efficiency improvements rather than maximizing an up-front sales price or a broad distribution of ownership. Above all, the process should be transparent.

In establishing the procedures for privatizations, governments should not place arbitrary restrictions on potential purchasers. Large new investments before privatization of the company should be avoided since, in practice, they are rarely recovered in the sales price. Consideration must be given to how environmental problems due to the parastatal operations will be treated. The social costs of employment reductions should be eased through adequate severance payments, re-training initiatives and incentive programs to encourage new, sustainable forms of employment. The market should set the divestment price, and sales should be for cash rather than future payments which may fail to materialize.

Privatization should have significant medium and longer-term benefits for the economy. However, it may cause difficulties where the government needs to maximize revenue from the parastatal mining enterprise for macro-economic adjustment efforts and to ensure meeting IMF or donor conditions. A successful outcome in such cases although difficult should still be possible.

Artisanal Mining

Responsibility for artisanal mining would rest with the Department of Mines. This sector of the mining industry has undergone considerable growth in many African countries in response to accelerating economic decline, overvalued official exchange rates which encourage smuggling, and the inability of governments to exert effective control. This has brought problems of law and order, safety, environmental degradation, and the loss of potential government revenue. Many attempts have been made to regulate the sector and stem the flow of smuggled wealth but the

situation will persist until miners can see some prospect of gain through integration into the formal mining sector.

Many artisanal miners are individuals or families who typically have no mining rights, no mine plans, and sell their product to whoever turns up to buy it. They may well operate seasonally being involved in agriculture for much of the year. Others are organized groups who sometimes operate with mining rights and have more advanced methodology, which may even involve limited mechanization. Most mining is near surface but there are examples of underground operations with depths of 50 m or more. Production from both groups is often smuggled to obtain higher prices and avoid taxes.

Activities are predominately associated with high-value, low-volume products such as gold, diamonds, emeralds and other precious stones, high-grade chromite, and cassiterite. Artisanal production in Tanzania is estimated at 1.5 to 5 metric tons per year gold and in Guinea, 7 to 10 metric tons per year gold and around 100,000 carats diamonds. Artisanal miners in Zaire and Zambia produce significant quantities of gold, diamonds and emeralds. The estimated value of artisanal production in Africa in 1989 was about US\$1,000 million of which US\$200 million is included in formal exports and US\$800 million a year is informal production (see Table 6.1 overleaf).

Positive aspects of artisanal mining include increases in rural employment and incomes, and perhaps minor fiscal benefits to the government, all of which stimulate the local economy. Almost one million miners and their families in Africa are dependent on artisanal mining for part or all of their livelihood. Artisanal mining may also be viewed as a first step in exploration and frequently provides basic geological information to industrial mining concerns.

Negative aspects are environmental degradation, poor health and safety conditions, inefficient mining practices which result in low recoveries, and loss of foreign exchange from the formal sector. In some cases artisanal mining can also disrupt rural life and local agriculture. In many countries, artisanal miners operate illegally with respect to a multiplicity of national laws and regulations, but in most cases this is primarily a legal concern and does not cause significant social harm.

Table 6.1. Africa: Estimated Importance of Artisanal Mining.

Country	Main Mineral(s)	Estimated Production Volume	Estimated Production Value	Estimated Employment
		MT (Gold) or 000 Cts(Diamonds)	Millions of US\$	Thousands
Angola	Diamonds	1,000 - 1,500	200 - 300	30
Botswana	Diamonds			
Burundi	Gold, Tin			10
Burkina Faso	Gold	3-4	45	60
Cameroon	Gold			
CAR	Diamonds	0.5	5	10
Cote d'Ivoire	Gold			
Ethiopia	Gold			10
Gabon	Gold			
Ghana	Diamonds	450	13	5 - 10
	Gold	1	7	10 - 20
Guinea	Diamonds	100	20	30
	Gold	7 - 10	80	20 - 30
Kenya	Miscellaneous			
Lesotho	Diamonds			
Liberia	Diamonds			
Mauritania	Gypsum			
Madagascar	Gold	2 - 3		5 - 10
Malawi	Gemstones			
Mali	Gold	2 - 3	25	100
Namibia	Tin, Semi-precious stones			1
Niger	Gold	1	12	15
Rwanda	Tin			5 - 10
Senegal	Gold	2	25	3
Sierra Leone	Diamonds	500	200	75 - 100
	Gold	1	12	25 - 40
Tanzania	Gold	1.5 - 5	35	20 - 30
Uganda	Gold			
Zaire	Diamonds	> 12,000	> 200	300
	Gold	4	45	150
Zambia	Gemstones		> 200	15 - 30
Zimbabwe	Gold, Chromite			30
Total			c. 1,000	c. 1,000

Source: Mining Sector Reviews, Notstaller, BUGECO, employment includes seasonal workers.

Typical artisanal gold mines in Tanzania are a good example. These are up to 35 m deep and workings are laid out with little or no knowledge of rock stability. Operators and government officials estimate a 5 percent per annum fatality rate and an injury rate substantially higher. After the ore is brought to the surface, hand crushing causes acute respiratory problems and distillation of amalgam leads to mercury poisoning.

The problems are not limited to the mining site. Informal villages spring up which have little or no basic sanitary services and which often bring law and order problems. The shift from farming to speculative digging has reduced food production which threatens famines in some areas. The greater availability of money has created pockets of inflation, putting pressure on the price of necessary goods and further impoverishing those who do not participate in mining.

In many places severe environmental side effects require urgent attention. Where large numbers of artisans are working, it is common practice to clear the bush by burning to establish both the mine site and the villages, thus destroying the flora and driving out wildlife. Sterile waste is piled on what little topsoil exists and streams become silted and polluted with mercury and other heavy metals.

Government revenues are lost because existing marketing arrangements permit sales only to the government or its designated agents. Usually purchases by official agents have been made at below world market price and paid for in non-convertible local currency after significant delay. Often a government purchasing agent is not even geographically close to the mining area. Miners therefore deal with illicit buyers who discount the price paid by up to 50 percent but who pay promptly in an acceptable mix of currency.

The infringement of legally granted mining concessions is a frequent problem with high-grading by artisanal miners reducing the overall grade of mineral subsequently available to the industrial operator. In addition, the need to police the concession increases operating expenses, reducing earnings and taxes.

Artisanal mining in Africa is a fact of life and the policies adopted must recognize this reality. In a few countries, artisanal mines are permitted under the mining law but generally such miners have few rights and can be displaced by

commercial mines. In many countries they are simply illegal. In most cases the illegality is a rational response to poorly formulated legislation, inadequate enforcement, and economic distortions. The challenge is to successfully modify these factors and provide incentives so that artisanal mining will be encouraged, become regularized, grow and produce more revenue for both miners and government.

The two key issues are the legal right to mine and satisfactory marketing arrangements. Often mining codes provide special arrangements for the issuance of concessions to artisanal miners but some of the regulations re-institute the problems they seek to eliminate. As an example, the new regulatory framework in Madagascar requires that artisanal miners complete complex application procedures supported by sophisticated land surveys. This type of procedure is difficult, discouraging, and in practice can be expected to lead to non-compliance.

There should be simple procedures for artisanal miners to obtain a mining concession or concessions in return for a nominal annual surface rental in the same way as any other mining entrepreneur. The concession should also be freely tradable so that the artisanal miner can later sell that right to a commercial mining company if the opportunity arises.

This is the most effective way to formalize many diggings. Once depth, falling grades or metallurgical difficulties start limiting production, the small-scale miner will move on. If however he can sell his rights to a mining company he may prefer to continue as an employee. In successful cases, the mine is developed more rationally on a larger scale which results in greater production, increased revenues, and taxes for the government.

Regulations for environment, health and safety in the sector should be realistic. It is not feasible, at least initially, to insist upon the same high standards of operation that could reasonably be applied to larger operations. However, the government should attempt to create an administrative presence in the mining areas to control the worst aspects of artisanal activity, especially those regarding environment, and health and safety and provide some basic services, and assist technically. This should gradually encourage more formal development. Technical assistance can identify orebody, upgrade mining technologies, increase recoveries and improve

health, safety, and environmental standards. Governments could offer technical assistance to artisanal miners through the Department of Mines.

The government should legalize private sector purchasing arrangements for mineral production at free market, international prices to discourage smuggling. Due to the disparate nature of most small-scale mining operations, this is unlikely to be trusted, at least in the short term, and smuggling and revenue loss will continue. It

will probably be preferable to auction buyer's licenses, rely upon license revenue in lieu of tax, and leave buyers free to negotiate their own purchases. If the government is concurrently operating an open purchasing system based upon international prices, the market will soon reach equilibrium. If governments insist on maintaining government purchasing offices, they should not be given a monopoly but should compete in the market place with private buyers.

INFRASTRUCTURE AND ENVIRONMENT

Infrastructure

The previous chapters have addressed the regulatory framework, taxation arrangements and institutional capabilities to support new mining investment. But clear rules and sound policies are required to address the adequate provision of infrastructure and to ensure satisfactory environmental, health and safety standards.

Over most of Africa, infrastructure is poor and policy regarding its provision for mining projects is neither well developed nor clearly stated. Inadequate infrastructure is a deterrent to both exploration and mine development as it raises the cost and risk of mineral projects. Some companies already disregard areas of high geological potential because infrastructure deficiencies make exploration extremely costly and the chance of a viable project very remote. Infrastructure is one of the main problems confronting existing mines, both state and private.

Examples of acute infrastructure problems range from the daily frustrations of telecommunication failures in almost all SSA countries to the interruption of transport routes for the Zambian copper mines, notably unreliability of the Tazara Railway and congestion at the port of Dar es Salaam. A lack of infrastructure is the single largest constraint to development of the Miferso iron ore deposit in Senegal, and a major issue for development of the Perkoa lead-zinc deposit in Burkina Faso.

For enterprises already involved in development and production, the problems are identifiable and solutions can be devised, even though they are often expensive and difficult to implement. For exploration activities, however, the problems of access to and communication from prospective areas can be intractable.

Few African governments are financially able to provide the necessary infrastructure to support new mines or to drive roads into

geologically promising areas. A vital component of reformed mining policies should be a clear policy on the provision and operation of infrastructure since most new mine developments are likely to have to bear the full cost of installing, operating and maintaining their infrastructure, no matter what the nominal ownership arrangements may be.

In individual country or project circumstances, however, this position may need modification. Investors consider their sovereign risk exposure significantly reduced if governments have a stake in the success of the project and infrastructure provided by government or financed by official donors can add assurance to investment agreements. By providing all or part of the infrastructure, countries may also encourage investments in other sectors of the economy and open new regions to development.

For prospective mining projects, a government has three options in respect of infrastructure provision: no provision, provision in return for an equity share equal to the value of the infrastructure, and provision in return for user charges. Circumstances will dictate the choice but it is desirable that government policy be spelled out in these terms. Investors will then know the criteria upon which infrastructure may be provided. The reduction in this uncertainty alone will improve the investment climate.

In some situations, governments may consider contributing to the financing of infrastructure because their discount rate could be lower than the private investor's. For example, there may be projects which are economically attractive to the country which appear marginal to the investor because of country-related risk perceptions. In such cases, government construction of infrastructure in return for equity or user fees may make an otherwise marginal mining project meet the investor's economic criteria. Where a public contribution reduces risk

to the private investor it also reduces the required rate of return and may increase the mineral rent available to be taxed.

There is a risk to the government that if the mine fails, the infrastructure may become idle with insufficient revenues to service the debt. In cases where the government provides infrastructure which is dependent upon continued mining activities to be viable, it will be necessary to have some type of guaranteed minimum payment, backed by a credible main shareholder, to ensure that the infrastructure costs will be recovered. Such a change should be strictly limited to cost-recovery and should not be a source of "hidden taxation" as has occurred in some industrialized countries.

The creation of infrastructure for one project often reduces costs for further exploration and subsequent projects. Examples include construction of a road or railway into an area where development of more than one mineral deposit is likely, and the construction of a dam for hydro-power generation where additional low-cost capacity can later be added. Such public investment can ensure that a mineral development project goes ahead and provide a major incentive to future mining and regional development.

Another alternative is the construction and ownership of infrastructure by enterprises other than the mining company or government. In some countries, public utilities already operate at arms length from the government or have been privatized which opens opportunities for the supply of infrastructure by third parties. For example, independent power companies could supply electricity and independent consortia could build and operate railways or ports. If such arrangements are possible there is every reason for governments to encourage them and to interfere as little as possible in the contract terms negotiated.

To ensure efficient operation the management and operation of infrastructure specifically constructed for or dedicated to a mining project should be generally the mine operator's responsibility. Under present African conditions this is appropriate even where the facility is to be linked to national networks such as railways, roads, and telecommunications. Where existing or improved public facilities are to be shared with mining projects, a guarantee of efficient operation is more difficult to secure. Performance criteria need to be written into

operating contracts so that mine operators have a right in defined circumstances to take over operatorship of a railway or a port for example, on condition that they continue to provide services to third parties. Mineral investors should be given the right to compete with national monopolies in the supply of services if they find it economically justifiable to do so.

Environment, Health and Safety

Introduction

In comparison with global and national environmental issues such as deforestation, desertification, and climate change, the effects of mining are generally localized, identifiable and specific, and adequate technology is available to deal with them. The necessary measures to safeguard the environment and the health and safety of the population and the workforce can be incorporated in legislation and regulations.

Potential mining industry environmental consequences can be divided into activities which effect drainage systems, the ground, and the air. Each mine or processing plant will have its own particular problems and specific solutions but the following examples illustrate the types of problems that may be encountered.

Open pit mines require substantial areas to be cleared of vegetation for the pit and waste dumps and topsoil needs to be stockpiled separately for use in subsequent restoration. Potential environmental hazards associated with open pit mining are largely limited to dust and control of drainage and storm water. Underground mines are less obtrusive and smaller areas of land will need to be cleared for waste dumps and shaft facilities. Surface subsidence may occur as mining progresses and this will affect location of buildings, tailings dams, and other facilities.

Processing operations are potentially more hazardous. In precious metals leaching operations, care must be taken to install adequate impermeable liners beneath leach pads and solution ponds to prevent escape of toxic liquids. Careful provision must also be made for control of storm water. Tailings must be safely impounded and the associated solutions, which usually carry traces of heavy metals and reagents, may need additional treatment before being discharged. Dust and the handling of toxic

chemicals are often health and safety factors to be considered. Smelting operations produce sulphur dioxide and heavy metal-bearing dusts which must be scrubbed before being discharged to the atmosphere.

Most African mining operations lag behind industrialized and more advanced developing countries in environmental, health and safety conditions. This is especially so at state-run mining operations in countries facing severe budgetary and debt service problems because lack of funds has limited replacement of old technology. New plant and equipment usually provides both improved efficiency and superior environmental performance. Environmental conditions are also poor in many artisanal mining areas.

Environmental conditions at most modern, privately-controlled mines are better. This is often because the operations have been built on greenfield sites which made it simple to incorporate protection measures at the planning stage. Major international mining companies have adopted their own environmental protection standards which equal, and sometimes exceed, internationally recognized standards such as those of the U.S. Environmental Protection Agency. Many companies initially adopted this approach because of pressure from shareholders and lenders, and a sense of corporate responsibility in the face of ever stronger public criticism. These reasons are still valid but companies have discovered that attention to the environment provides them with a range of tangible and intangible benefits.

Improved physical environments are conducive to improved productivity in the mines and plants, and in the community at large. Concern for the environment also raises the international standing of the company. It becomes more readily seen as a reliable joint-venture partner by both governments and other companies. This gives it a competitive edge. There are potential gains to be made from what at first sight appear environmental costs. For example, recovery of arsenic and sulfuric acid from roaster and smelter gases, and retreatment of tailings before re-impoundment can provide additional revenue. In such ways problems can be turned to advantage. In short, companies are discovering that good environmental management can be good business.

Environmental regulation in OECD countries with mineral industries, especially the USA, Canada and Australia, has provided a sharp stimulus to innovation in environmental protection technology. It frequently pays companies to acquire new technology as this often reduces environmental damage and production costs. Best practice technology is what international mining companies can be expected to bring to exploration and development in developing countries. It is likely that promotion of private mining in Africa will improve environmental performance in addition to providing direct economic benefits.

However, the fact that modern private mining investment is likely to improve the environmental situation is no reason to default on regulation. Inevitably some companies will be tempted to evade agreements if these are not adequately framed in law and there are no, or weak, enforcement procedures. A comprehensive environmental management program is needed for the mining industry and other sectors of the economy. While it is now impractical to bring environmental practices for all African mining operations up to international standards, it should be feasible to set priorities, implement an appropriate plan and achieve positive changes in two to three years on a case-by-case basis. The eventual aim should be to establish effective environmental regulations and a supporting institutional structure. In some countries it may be appropriate, as an interim measure, to have all mining regulatory activities including environmental matters subject to the Ministry of Mines. To avoid conflicts of interest, however, a separate national environmental office will be preferable.

Standards and Policies

Appropriate environmental, health and safety standards need to be set and procedures established for monitoring compliance. Many industrial countries have adopted standards set by neighbors with similar environments or have adopted the U.S. Environmental Protection Agency standards. Such standards will perhaps need to be modified for local conditions. Health and safety standards can also be adopted from industrialized countries. In most cases it should be straightforward to arrive at appropriate standards.

Once standards have been formulated, it will be the duty of the appointed regulatory agency to monitor compliance. In formulating legislation and negotiating agreements there is a choice to be made between command and control policies and market-based instruments. Most industrial countries tend to rely on command and control policies which involve setting emission or effluent standards and requiring that standard to be achieved. The precise pollution control technology to be used is often specified.

Increasing attention is being given to the design and introduction of market-based policies which can be either price-based or quantity-based. Pollution taxes or deposit-refund systems are price-based (the "polluter pays" principle) while tradable pollution rights or marketable permits to emit or discharge are quantity-based. At present, some prototype instruments are being tested and proved in some industrialized countries. In current African conditions, command and control policies adapted for local conditions are probably most appropriate. There may be opportunity for price-based mechanisms, but initially these are unlikely to extend much beyond general tax incentives to undertake environmental protection measures.

Procedures and Agreements

Africa needs to address the environmental, health and safety shortcomings of current mining operations and ensure that new mining projects operate at acceptable standards. Pending comprehensive legislation, problems at existing mines should be identified and initiatives taken to address them. At existing operations, the Ministry of Mines should instigate environmental audits and health and safety reviews to establish performance and identify the most critical areas for improvement. A realistic timetable for priority actions should then be agreed with the company and subsequently be implemented with specific sanctions applied if the timetable is not adhered to.

Standards for new projects should be set in project agreements and environmental considerations such as siting of facilities, protection of ecologically sensitive areas, and human health and safety, should be included at the earliest stage possible in project planning and design. It is important to create awareness of environmental protection issues among investors,

host governments, and the local population. Their cooperation and understanding is vital.

A **Baseline Environmental Study** should be carried out to provide a picture of the status of vegetation, rivers, streams, air quality, and wildlife before the new project commences. The baseline study provides the reference against which the impact of the mining operation will be measured and provides a valuable safeguard for the company. It ensures that the company cannot later be blamed for environmental damage existing before mining took place. A baseline study cannot be rushed as it should encompass at least one full annual seasonal cycle. In areas with high levels of prospecting activity and good prospects for investment, the government may wish to undertake baseline environmental studies itself.

The next stage is preparation of an **Environmental Impact Assessment** accompanied by an **Environmental Action Plan** to mitigate any negative effects. The action plan, which should be based on the baseline study and impact assessment, should be an essential prerequisite for investment approval. There should be transparent procedures for the preparation of each of these documents by investors. The action plan should allow for modification by the company and regulatory authority subject to agreed criteria. This follows accepted environmental practice in the United States, Canada, Australia, and other industrialized countries. Finally, there needs to be adequate and clearly specified reporting requirements and monitoring procedures together with appropriate sanctions if agreed environmental standards are not met or environmental problems go uncorrected.

In addition to environmental studies and plans, there is an important need for social impact analyses for mining projects and developments. The local community generally bears the brunt of any negative effects of mining activities (increased pollution, noise, congestion and so on) whereas the benefits (especially in terms of tax payments and foreign exchange generation) mostly accrue at the national level.

It is important that social impact analyses be undertaken to identify and assess the impact on affected communities and that suitable compensation and mitigation methods be designed and implemented. There needs to be established procedures and mechanisms so that affected people can be adequately represented especially in

cases where relocation is necessary, where established or alternative forms of employment are displaced by mining activities, or where tribal peoples are affected.

Environmental science and knowledge is advancing at a great rate and standards acceptable now may not be in a few years time. For investors the prospect of government altering environmental regulations after their investment is in place is just as alarming as realizing that the economic assumptions on which the decision to develop was taken have changed. Provision must be allowed for changes in circumstance without undue penalties to company or government. Changes to regulations or requirements initiated by government or company should be subject to agreed criteria and any dispute should be settled by some acceptable form of arbitration. Most developing countries now agree to dispute settlement by international arbitration or expert determination.

Compensation and Reclamation

In negotiating environmental provisions, the limits of risks in the case of catastrophe need to be considered. The question is whether company liability for unforeseen environmental damage is to be limited. Most companies wish to limit their liability but governments will usually argue that it is not in the public interest to do so. Liability for environmental catastrophe is currently testing the ingenuity of negotiators worldwide.

In some mining agreements and environmental codes, governments retain powers to suspend operations they consider environmentally damaging. The existence of a unilateral power of this sort greatly increases perceived risk to the investor. However, since both government and company would lose revenue through suspension, they have a mutual interest in ensuring that such powers do not have to be used. Most modern agreements require companies to take prompt measures to deal with emergencies and consider expenditure on such emergencies as ordinary operating costs.

Procedures must be available for dealing with environmental damage claims. Compensation claims can disrupt mining operations unless procedures and funds for settlement are in place. Although such claims

increase costs and reduce taxable profits, governments and companies have a mutual interest in satisfactory settlement arrangements.

Reclamation of exhausted mine sites raises related issues. Reinstatement of mining land to its original state is frequently impracticable and even if technically feasible likely to be prohibitively expensive.

The costs of reclamation must be met either by charges on the company or be shared between company and government. There are four ways to provide for reclamation costs. All require a costed and approved reclamation plan, which is likely to be theoretical since it must initially be prepared before the mine is started.

- Allow the company to make tax-deductible provisions. This is a problem for jurisdictions observing English tax law since deductions cannot normally be taken until actual expenditures are made. The funds provided would remain exclusively under the control of the companies.
- A reclamation fund under independent or joint control could be built up by company tax-deductible contributions in proportion to the estimated depletion of the ore reserve. The eventual target value of the fund would be reappraised regularly in the light of mining activity and any other changed circumstances.
- Government and company could fund agreed reclamation expenditures in proportion to the shares of cash flow they have derived from the mine.
- As is allowed in the USA, a carry-back of tax losses could be introduced to allow companies to recover reclamation expenditures against past tax payments.

The difficulty with both the third and fourth options is that they effectively require governments to provide lump sum grants towards reclamation. The current state of public finances in Africa makes this unrealistic. Accordingly, the independent reclamation fund appears the most promising approach.

Summary

The major immediate problem is tackling the worst environmental aspects of existing mining operations. Much dereliction is to be found around mining operations in Africa but there is no reason to suppose that new mining investment will bring more. On the contrary, it is quite feasible to provide good environmental standards on a greenfield site, and private mining companies can be expected to install the most efficient technology, which in almost every case will be the most environmentally favorable. The major mining companies have learned that good environmental management, despite apparent costs, provides tangible and intangible benefits.

Yet there is a need for efficient monitoring and regulation of the industry and this will require a comprehensive regulatory framework. Until this is in place, guidelines with standards and procedures incorporated in investment agreements must suffice.

Improving the institutional capabilities of African countries to assess environmental impacts of existing mines and proposed projects will require external technical assistance in a form that emphasizes training. This is best achieved through short-term, frequent consultancies rather than resident technical assistance. Joint-ventures between national and foreign consultants and long-term agreements between African agencies and similar agencies in industrialized countries will be important in this initiative.

8

AGENDA FOR AFRICA

Introduction

This report contends that rehabilitation of the existing mining industry and a resurgence of mining investment in Africa are achievable. The necessary measures to achieve these ends have been described. However this will require a sustained effort by all parties. The three main parties involved are (1) the African governments, (2) the Bank and other donor agencies, and (3) the international mining companies.

The 1980s was a period of difficulty and challenge for the world mining industry. Winners and losers have emerged. The winners are companies which made deep-rooted adjustments; closing older capacity, diversifying production, and improving the efficiency of their remaining facilities. These companies have emerged leaner and stronger and are now profitable. The winners also include countries that encouraged private sector mineral development such as Botswana, Chile, Indonesia, and Papua New Guinea, all of which have attracted large investments in recent years.

The losers have been companies whose efficiency improvements have been modest, which include many African state-controlled mining companies, and countries which failed to adjust to changing industry circumstances. African countries which persisted in emphasizing state-dominated mineral development have gathered little new investment in new capacity or growth during the 1980s.

Geological studies confirm Africa's plentiful resources and untapped potential. Lack of mineral endowment is not the restriction. A country-by-country review shows that Africa's mineral potential warrants two to four times the current exploration expenditure of US\$125 million per year and that investment of US\$250-500 million per year could result in a pipeline of five to ten medium to large mining projects by the late 1990s. This would permit Africa to achieve a

5-10 percent real annual growth in mineral exports from the late 1990s onwards. However, such a growth rate would require total exploration and capital expenditures of more than US\$1,000 million annually from the mid-1990s onwards, over and above capital expenditures required to sustain capacity and make necessary operational and environmental improvements. In total, Africa would need to attract US\$2,500 million per year in exploration and development expenditures.

Funds of this magnitude cannot be generated by governments or their state-controlled mining companies, given the budgetary and debt service needs of most African countries. State companies are poorly equipped to compete aggressively in today's mining industry and local investors have insufficient capital. The only realistic source of such large sums is the international mining industry which currently spends about US\$3,000 million per year on exploration and US\$15,000 million per year on mining investment. Thus, Africa needs to attract about 14 percent of world exploration and development expenditure compared with about 5 percent today.

There is no worldwide shortage of mining investment capital. But Africa is failing to attract an adequate share of available funds away from other countries. Mining capital is internationally mobile and will go to the countries with the best project prospects. To attract significant amounts of mining capital, African countries need to implement private-sector strategies in the management of their economies, and provide investment terms and conditions competitive with those in other countries. Private entrepreneurs and investors should be allowed to find, finance, and operate mines, and market the production within a stable framework of policies and regulations established and monitored by the government.

To present Africa as a potentially rewarding rather than a potentially hostile environment to investors, a two-pronged approach is needed:

policy and institutional reforms to reduce both real and perceived risks, and promotional efforts to draw the attention of investors to the geological potential and opportunities. This will include making available the necessary geological data from which prospective areas can be identified.

All efforts by African governments, the Bank, and other donors will come to nought if the international mining community does not play its part. Fortunately, this seems unlikely. The geological potential of Africa is widely recognized. There are instances of major international companies backing away simply because there is not the will or decision-making capacity in certain African countries to grant the necessary exploration licenses under acceptable terms.

The program set out in this report is practicable and the time for reforms is ripe both politically and economically. An outline of key actions for African governments to take to attract new exploration and investment is set out here. Given the necessary resources and cooperation from governments, other donor organizations, and companies, the Bank believes it can assist substantially both as financier and intermediary in regenerating the mining sectors of the countries of Sub-Saharan Africa.

Actions by Governments

The responsibility for change in the first instance is on African governments. Governments have a choice. They can continue "business as usual" in which case mineral production, with few exceptions, can be expected to stagnate, or they can take the initiative to accelerate growth. The current good profitability of many mining companies provides an opportunity for the growth strategy.

The most important move is to create a suitable environment for private investment. This requires:

- Continued adjustment of macro-economic policies, especially market-based foreign exchange and trade policies.
- A clearly articulated mining sector policy that emphasizes the role of the private sector as owner and operator and of the government as regulator and promoter.

- Improved fiscal terms and other incentives for mining comparable to those in other countries.
- Legislation which ensures access to land and permits secure and tradable exploration and mining rights. Correspondingly, the obligations of investors should be clearly spelled out.
- Reorganized and strengthened mining institutions with regulatory, promotional, and facilitating roles. Institutions should end their current involvement in the operational and marketing aspects of parastatal mining companies.
- Total or partial privatization of state mining operations. Early privatization of public mining assets will be the most effective signal to international mining companies that governments intend to follow a private-sector strategy.
- Provision of private, incentive-based marketing systems to reduce illegal production and export of minerals by artisan miners.
- Introduction of adequate environmental, health and safety regulations. Environmental protection plans should be included in new project agreements.

Rejuvenating Africa's mining sector will require promotional initiatives to interest and attract foreign mining companies. This will mean ensuring that mining companies are kept informed of changes that may be taking place. It should also include establishment of promotional offices to provide potential investors with information and to facilitate their dealings with government and national industry. Reformed Geological Surveys will need to establish databases on past exploration, geology and mineralization, and make available geological and thematic maps.

Establishing an effective regulatory environment and institutional structure may take some years in most African countries. In the meantime, governments can take immediate initiatives by negotiating individual exploration and investment agreements. For this,

governments need to establish their general terms and conditions and put together a core of qualified officials capable of responding to investor enquiries and negotiating agreements. In countries with little or no mining experience, the core group would probably require support from experienced expatriate consultants.

Actions by the Bank and Other Donors

The Bank and donor community also have a choice. They can stand back and wait to see whether governments make the proposed changes, or take the initiative. In either case, revitalization of mining in Africa will require a concentrated effort from the donor community, including the Bank. The Bank should be prepared to assist in the reform of mining, taxation, and investment codes, and the overall policy and institutional framework. It should also be prepared to participate in mobilizing finance for new mines and associated infrastructure on a selective basis, where governments have a minority participation in joint ventures and where a qualified private partner takes the lead as operator and majority owner.

A strong trusted presence is needed to act as a facilitator in negotiations between governments and companies. Many mining sector administrative institutions in Africa have not been exposed to the negotiation and operation of mining business in the rest of the world. This tends to make them ineffective representatives of their governments and difficult working partners for interested investors. Investors need "someone competent to talk to and work with" if they are to be attracted away from other countries. The presence of an independent voice could help reconcile the needs of investors with government's fears of being exploited. It is noteworthy that the presence of the IFC as an equity partner in a number of recent Africa mining projects has proved reassuring to both sides.

The preparation of a clear policy statement provides a structural process for the government to grapple with and think through key issues regarding mining sector development. Such issues include, the role of the public sector and the private sector, the degree of tax burden and the selection of tax collection mechanisms. Such a policy statement would provide the country with a framework for ensuring consistency and

avoiding overlap between assistance from different donors.

But few countries have prepared such a statement or have the capabilities to do so. In this donors should be prepared to provide assistance as necessary. The mining sector policy statement should be closely related to and supported by the country's macro-economic and trade reform efforts.

The overall drive of the Bank and donors efforts should be directed at reducing country risk. The various policy and regulatory reform efforts can assist in designing appropriate legal safeguards to reduce country risk for the investor and protect the interests of the country. Institutional reform measures can assist with ensuring that the rules are implemented in a stable and consistent manner. In addition, the Bank and donors (such as the European Investment Bank, the EEC SYSMIN facility and the African Development Bank) can reduce country risk by directly participating in the financing of projects and by being parties to agreements between investors and host countries. Agencies such as ICSID can provide for arbitration procedures to resolve disputes between investors and governments. Finally, agencies such as MIGA, OPIC, U.S. Exim Bank, EFIC in Australia and EDC in Canada can provide specific political risk insurance and compensation if particular rules are broken.

In addition to initiatives to reduce country risk, the Bank and the donor community should support promotional efforts and provide a strong data base for potential investors. An important task will be providing technical assistance to establish an adequate data base for potential investors including the compilation and indexing of all available data and information regarding geological and mineral potential, the preparation and publication of topographical, geological, mineral inventory and other thematic maps, the reprocessing of available basic geological data and preparation of promotional brochures and presentations to investors.

In summary, the role of the Bank and the donor community would include:

Policy and Regulatory Reform

- Maintaining sound macro-economic policies.

- Establishing clear mining policies with updated legislation and fair and competitive fiscal terms.

Institutional Strengthening

- Designing model investment agreements and assisting in negotiations with investors.
- Assisting with analysis of environmental issues and design and implementation of environmental standards and safeguards.
- Providing technical assistance for the privatization of parastatal mining companies.
- Supporting development of strong capabilities to administer the mining code and negotiate agreements.

Exploration and Investment Promotion

- Helping geological surveys assemble and re-evaluate information using modern techniques, and publishing geological and other maps.
- Supporting training efforts, introducing computer technology for geological database preparation and information systems.
- Designing and supporting promotional activities including brochures and presentational events.
- Participating in mobilizing the necessary financing for mine and infrastructure investments on a selective basis.

AFRICA—OWNERSHIP AND MANAGEMENT OF MINING PRODUCTION IN 1989

COUNTRY	MAIN MINERALS	ENTERPRISE	GOVT.SHARE OF OWNERSHIP	VALUE OF PRODUCTION (US\$ Millions)				
				OWNERSHIP:	PRIVATE	IV	STATE	
				OPERATOR:	PRIVATE	PRIVATE	STATE	
Angola	Diamonds	ENDIAMA	100%			230		
Botswana	Cobalt/Nickel/Copper	BCL	15%			200		
	Diamonds	Debswana	50%			1300		
Burkina Faso	Gold	SOREMIB	100%			30		
CAR	Diamonds		0%		40			
Ethiopia	Gold	EMRDC	100%				10	
Gabon	Uranium	COMUF	25%			50		
	Manganese	COMILOG	30%			175		
Ghana	Bauxite	Ghana Bauxite	55%			5		
	Gold	Ashanti Goldfields	55%			110		
	Gold	SGMC	100%			20		
	Gold	several	10-30%			20		
	Diamonds	GCD	100%				15	
	Manganese	GNMC	100%				15	
Guinea	Bauxite	CBG	49%			325		
	Aluminum	Friguia	49%			130		
	Bauxite	OBK	100%				75	
	Diamonds	Aredor	50%			55		
	Gold	AUG	49%			15		
	Gold	several	0%		30			
Kenya	Fluorspar	Kenya Fluorspar	50%			10		
Liberia	Iron Ore	Bong Mining Co.	50%			120		
	Iron Ore	LAMCO	62%			80		
Madagascar	Chromite	Kraomita Malagasy	90%			10		
Mali	Gold	Syama	20%			25		
Mauritania	Iron Ore/Gold/Copper	SNIM	73%				180	
Namibia	Copper	several	0%		125			
	Diamonds	CDM	0%		320			
	Gold	Otjihase	0%		10			
	Lead/Zinc	several	0%		60			
	Tin	IMCOR Tin	0%		10			
	Uranium	Rossing	0%		250			
	Miscellaneous	several	0%		25			
				SUB-TOTAL		870	2910	295

AFRICA--OWNERSHIP AND MANAGEMENT OF MINING PRODUCTION IN 1989

COUNTRY	MAIN MINERALS	ENTERPRISE	GOVT.SHARE OF OWNERSHIP	VALUE OF PRODUCTION (US\$ Millions)			
				OWNERSHIP:	PRIVATE	IV	STATE
				OPERATOR:	PRIVATE	PRIVATE	STATE
Niger	Uranium	SOMAIR	33%			80	
	Uranium	COMINAK	31%			150	
Nigeria	Tin	several	0%	10			
Rwanda	Tin	several	0%	5			
Senegal	Phosphate	CSPT	50%				55
	Phosphate	SSPT	50%			25	
Sierra Leone	Bauxite	SIEROMCO	0%	25			
	Diamonds	DIMINCO	51%				10
	Rutile	Sierra Rutile	0%	55			
Sudan	Gold	Sudanese Mining	100%				5
Swaziland	Asbestos	Havelock	40%			10	
	Diamonds	Dokolwayo	50%			20	
Tanzania	Diamonds	Williamson	50%			10	
	Gold	STAMICO	100%				
Togo	Phosphate	OTP	100%				115
Zaire	Cobalt/Cadmium	GECAMINES	100%				170
	Copper	GECAMINES	100%				1100
	Copper	SODIMIZA	100%				145
	Diamonds	MIBA	80%			90	
	Diamonds	several	0%	160			
	Zinc/Silver	GECAMINES	100%				90
	Tin	SOMINKI	28%			15	
	Gold	SOMINKI	28%			15	
	Gold	several	0%	15			
	Zambia	Co/Cu/Pb/Zn/Au/Ag	ZCCM	60%			1340
Zimbabwe	Asbestos	several	0%	60			
	Chromite	several	0%	25			
	Cobalt/Copper/Nickel	several	0%	110			
	Copper	Mhangura Mines	55%				30
	Gold	Sabi Consol	100%				40
	Gold	several	0%	135			
	Iron Ore	Buchwa	100%				10
GRAND TOTAL					1470	3325	3405

ACRONYMS

Acronyms	Enterprise	Country
AUG	Aurife de Guinée	Guinea
BCL	BCL Limited	Botswana
COMILOG	Compagnie des Mines d'Uranium de Francville	Gabon
COMUF	Compagnie Minière de l'Ogooné	Gabon
CBG	Compagnie des Bauxites de Guinée	Guinea
CDM	Consolidated Diamond Mines Limited	Namibia
COMINAK	Compagnie Minière d'Akouta	Niger
ENDIAMA	Emprisa Nacional de Diamantes de Angola	Angola
EMRDC	Ethiopian Mineral Resources Development Corporation	Ethiopia
GCD	Ghana Consolidated Diamond Limited	Ghana
GNMC	Ghana National Manganese Corporation	Ghana
LAMCO	Liberian American-Swedish Minerals Corporation	Liberia
OBK	Office des Bauxites de Kindia	Guinea
MIBA	Société Minière de Bakwanga	Zaire
SGMC	State Gold Mining Corporation	Ghana
SOREMIB	Société de Recherche et d'Exploitation Minières de Burkina Faso	Burkina Faso
SNIM	Société Nationale Industrielle et Minière	Mauritania
SOMAIR	Société des Mines de L'Air	Niger
CSPT	Compagnie Sénégalaise des Phosphates de Traiba	Senegal
DIMINCO	National Diamond Mining Company	Sierra Leone
GECAMINES	Generales des Carrieres et des Mines du Zaire	Zaire
OTP	Office Togalaise des Phosphates	Togo
SOMINKI	Société Minière et Industrielle de Kivu	Zaire
SIEROMCO	Sierra Leone Ore and Mineral Company	Sierra Leone
SODIMIZA	Société de Developpement Industriel et Minière du Zaire	Zaire
SSPT	Société Sénégalaise des Phosphates de Thiès	Senegal
STAMICO	State Mining Corporation	Tanzania
ZCCM	Zambia Consolidation Copper Mines Limited	Zambia

AFRICA COUNTRY ASSESSMENTS: POTENTIAL AND EXPLORATION REQUIREMENTS

Introduction

The following assessments are country summaries of mineral potential and estimated minimum exploration requirements over the next five years. The following countries are not covered: Cape Verde, Comoros, Djibouti, Equatorial Guinea, Gambia, Lesotho, Mauritius, Sao Tome and Principe, and the Seychelles, which have no significant mineral potential other than limited industrial minerals because of their size and geology. The exploration estimates are based only on the requirements for further development of the geological data-base, the further recognition of mineralized belts and their characteristics, the interpretation of data, limited evaluatory work on specific mineralized deposits and the publication of maps and reports. The estimates do not include requirements for detailed deposit evaluation work or development of reserves (pre-feasibility or feasibility studies). They are grouped in the following five categories:

Category A: US\$100 million or more over five years (that is, over US\$20 million per annum).

Category B: US\$50-99 million over five years (that is over, US\$10-20 million per annum).

Category C: US\$25-49 million over five years (that is, over US\$5-10 million per annum).

Category D: US\$10-25 million over five years (that is, over US\$2-5 million per annum).

Category E: US\$9 million or less over five years (that is, less than US\$2 million per annum).

Category A Countries

Namibia

Namibia occupies a favorable structural position astride the Damaran Orogenic Belt which is sandwiched between the productive Namaqua craton to the south and the Kasai-Congo craton to the north. The geology provides Namibia with varied and considerable mineral potential, and experienced private exploration has led to an extremely high level of knowledge and mining development. Hundreds of mineral prospects are known and mining is the backbone of the economy. The country is a medium level producer of copper, lead, zinc, and silver, and a lesser producer of gold, lithium, tin, tungsten, iron-pyrite, fluorite, rare-earths, and gemstones. The Tsumeb deposit is one of the world's greatest polymetallic orebodies. Coal reserves in the Karoo structures are upwards of 500 million tonnes but production is at present uneconomic. An extensive high-quality graphite resource has just been outlined. Namibia's mining industry is currently dominated by uranium (Rossing), and diamonds. Namibia produces about US\$250 million worth of uranium. Diamond production is valued at over US\$300 million, all from unique sand-dune, beach and offshore detrital deposits, even though many primary kimberlites are known. The potential is favorable for discovery of diamond-bearing kimberlites beneath the Kalahari sands. Continued exploration is fully justified and is required to replace present reserves with new

deposits, extend the life of other operations, and continue diversification. As in Ghana and Zimbabwe, which support a considerable mining economy and which have been subjected to a high level of exploration, continued exploration will require more detail and will consequently become more expensive per unit of ground investigated.

Zaire

Zaire is the second largest country of the region, has a substantial mining economy (80 percent of exports), is the third largest official diamond producer in the world, and has a substantial clandestine production of diamonds and gold. Zaire has an extremely varied and favorable geological potential with close to fifty percent of known world cobalt reserves and 10-20 percent of world diamond reserves but is substantially underinvested and underdeveloped. For example, two of the world's richest copper deposits, Tenke and Fungerume, lie idle. The gap between mine production and potential is probably the largest in the world. A major producer of copper, cobalt, zinc, and diamonds, Zaire also produces cadmium, silver, germanium, lead, tin, tungsten, colombo-tantalite and limited rare-earth metals. Limited coal mining is used for local consumption in the east. The gap between production and potential is most marked with respect to gold. Total production is close to three metric tonnes per year but even known potential would dictate a level closer to thirty metric tonnes per year. Minor new foreign investments are directed at two to three known gold deposits. Foreign private investment is limited to minority shareholding in the industrial diamond mining operations at Mbuji-Mayi and the decreasing tin-tungsten operations. Mining will never live up to its potential until major administrative changes are made and state dominance ended or considerably reduced, and mining has considerable potential to bring about change at every level of the economy. A dramatically increased and continuous exploration effort is technically fully justified.

Zimbabwe

Favorable granitic craton-greenstone terrane covers the eastern two-thirds of Zimbabwe as well as covering rocks in the west and bearing large coal deposits. The Limpopo mobile belt dominates in the south-east. The granitic craton is cut by the famous Great Dyke which extends north-south almost across the entire country. Except for the Great Dyke there are strong geological similarities between central Zimbabwe and northern Zaire. With varied geology and a degree of mining development and associated infrastructure more advanced than most countries of the region, it is not surprising that more than fifty minerals are produced. Principal resources are gold, coal, asbestos, copper, nickel, and chromite, which combined account for about eighty-five percent of mineral production by value. The greenstone based Midlands belt produces the bulk of the country's sixteen metric tonnes per year gold (five times that of Zaire in one fifth the area). Geologically, this belt is very similar to northern Zaire and the Abitibi belt of Canada. Potential for new gold discoveries and further developments in chromite, and platinum group metals are very good. There is limited emerald mining. Zimbabwe produces major amounts of asbestos, lithium and refractory minerals such as graphite, andalusite, kyanite and sillimanite. Investment by the foreign private sector is on the increase but foreign exchange restrictions have been a deterrent. Continued exploration is more than justified and must be considered a priority.

Category B Countries

Angola

Angola has considerable underdeveloped mineral potential and there has been an exploration lapse of close to fifteen years due to the civil war. The north-eastern diamond fields are part of a major diamandiferous district which extends northward into Zaire but the region

remains underexplored and underdeveloped. Angola could become the largest producer of gem quality diamonds in the world. Good potential also exists for gold, base-metals, iron ore, phosphate, carbonatite-associated rare-earth metals, and other gemstones. A considerable exploration effort is justified and demanded.

Botswana

Geologically Botswana is characterized by part of the South African craton and is cut by two mobile belts; the Damaran in the north-west and the Limpopo structure to the south-east which carries the Selebi-Phikwe copper-nickel deposit. The covering Kalahari sands inhibit exploration over much of the country. Diamonds are the major mineral product and the possibility of discovering new deposits is reasonable. There is some potential for other copper-nickel deposits, chrome, gold, and platinum group metals. Ongoing exploration is aligned towards similar discoveries in the south of the country along the Limpopo extension. On the industrial minerals side, the Sua Pan soda-ash project which has reserves for 1,000 years, is a recent major development.

Ethiopia

Gold mining has been a traditional activity for more than 2,000 years but industrial scale mining is in its infancy. Ethiopia is not dominated by cratons and intervening mobile belts but lies within the so-called Pan-African Afro-Arabian domain. Known gold and base metal mineralization is associated with old remobilized pre-Rift structures in the Proterozoic crystalline basement where these "windows" are exposed through the younger volcanic terrane. Dominating the geology and topography is the Red Sea-East Africa rift system with associated volcanism which obscures most of the potential metalliferous structures. These are mainly exposed in the north (Tigray and Eritrea), west (Wollega), and south (Sidamo). Despite this, there is considerable potential for gold and base

metals. A new mine was recently developed at Lega Dembi in the south with planned output of three metric tonnes per year gold. This mine lies within a belt of considerable potential but exploration and evaluation work has been limited and a massive infusion of capital and modern exploration technology is required. The northern areas of Tigray and Eritrea must be considered virgin ground even though small zinc and copper deposits had been outlined before the outbreak of war. The rift system and associated shallow sea and lacustrine sediments provide a good geological environment for industrial minerals; potash, soda-ash, clays, and diatomite among others. Ornamental stones are being exported on a small scale but these and other low unit value industrial minerals directed at the export market suffer from lack of infrastructure.

Ghana

A major intra-cratonic structural dislocation associated with volcano-sedimentary greenstone (Birrimian) terrane bears some of the most spectacular gold mineralization in Africa. Until recently this traditional industry was in decline because of state-dominance, a deteriorating economy, and a lack of re-investment, exploration and reserve development. By adopting modern policies the government has reversed this trend, private investment has increased and total annual gold production exceeds twenty metric tonnes per year from all sources, making Ghana the largest African gold producer outside South Africa. Major potential still lies with gold within the known mineralized belt which is characterized by shear controlled gold quartz lodes, the Witwatersrand-type conglomerate reefs (Tarkwaian). The north and north-west of the country has been subjected to very limited exploration work. Ghana has been a traditional diamond producer but the readily accessible deposits have been depleted and only low-grade alluvial deposits remain. Production has decreased tenfold over the last decade. Because of the relatively small areal extent of the country and the considerable diamond activities in

the past, it is questionable whether a further significant diamond resource base is present.

Mozambique

Eastern Mozambique is an area of geologic structural importance between the Kaapvaal craton of South Africa and Zimbabwe and the Tanzanian craton to the north. The Limpopo mobile belt extends into the western part of the country. As a result, Mozambique possesses considerable mineral variety, most of which is little known. The development priorities are gold, heavy minerals, coal, precious and semi-precious gemstones, and some industrial minerals. There have been recent investments in gold and heavy minerals. In the Manica area alone, over forty abandoned gold mines are known and the future resource base is probably more than fifty tonnes. The Moatize coal basin in Tete province is relatively well known but railroad rehabilitation will be required to substantially increase production. Close to three billion tonnes of reserves are indicated at Minjora (Zambesi). Gemstones are being mined on a small scale and include garnet, tourmaline, beryl, emerald and topaz. The potential for developing this industry (and possibly diamonds) is considered good. The potential for copper, nickel, platinum group metals, and non-metallics such as apatite, fluorite, and graphite is fairly good. A considerable investment in further exploration is required.

Sudan

Sudan is the largest country in Africa and one of the least developed. Despite considerable geological variety it supports no major mining industry. Structurally, the country straddles the divide between one of the northernmost cratonic areas of Africa (Chad) and the Afro-Arabian domain. Recently two or three small gold mines have been developed in the Red Sea hills. These deposits have been worked intermittently on a small scale throughout history and are similar to deposits along the fault-controlled coastal hinter-

land of both Egypt and Saudi Arabia. It is one of the few countries in the region with chromite mineralization but production has dropped over the last two decades from about 20,000 metric tonnes per year to less than 10,000 tonnes. Little modern mineral exploration has been carried out although there is good potential for gold and base-metals in greenstone-volcanic terrane, particularly that associated with the cratonic and pericratonic areas in the west and south-west. The possibility of diamond occurrences in the south-west was investigated by the UNDP with negative results. However an eastern extension of the diamondiferous sediments of the central African Republic and kimberlite recognition is still possible. A large exploration effort including data compilation and reassessment is well justified. A major deterrent is lack of infrastructure and distance from ports. For many years to come, priority must be high unit value products.

Zambia

Zambia has a very favorable regional geological setting. The copper-cobalt deposits are unique, and with their extension into Zaire form the world-famous Copper Belt. Copper ore reserves are still probably about two billion tonnes. The Broken Hill (Kabwe) zinc-lead mine has been in production for close to ninety years and reserves are becoming limited. Now state-dominated, the industry is in decline because of lack of reinvestment and general inefficiency but private investment is on a slight increase and there is good potential for gold, further base-metal deposits, nickel (Munali), and gemstones. More than 200 gold occurrences are known and, once the right investment climate has been created, further investment should yield dividends. The economics of developing known manganese reserves and manganese derivatives are still not viable although the development of coal, iron-ore and phosphate reserves may be possible in the medium to long-term. The estimated production of emeralds, aquamarines, amethysts, and other gemstones is over US\$200 million per year but

only twenty five percent of this enters the formal economy. There is also good potential for fluorite and numerous other industrial minerals. A strong and continued increase of major exploration programs must be encouraged.

Category C Countries

Burkina Faso

Basic exploration financed by the UNDP, the World Bank, the government and two major international mining companies has led to the recognition of considerable gold and base-metal potential associated with well-developed greenstone sequences. Artisanal miners in the district produce more than three metric tonnes per year gold but mining is still in its infancy. The Perkoa zinc deposit discovered in 1983 is now in a pre-development stage but a large manganese deposit at Tambao in the north cannot be developed because of low ore-quality and a lack of infrastructure. Continued exploration and data compilation is a high priority.

Gabon

Manganese and uranium dominate the mining sector. There is still over 50,000 mt contained uranium in reserves at the four principal mining areas and potential for discovery of new deposits. The Boka-Beling-Mekambo iron ore deposits could eventually be suitable for development if and when the Trans-Gabon railroad is extended and port facilities constructed. There is good potential for the discovery of gold, base metals, carbonatite-related rare earths, phosphate and possibly diamonds. Barite deposits are known and may supply local demand for drilling muds and talc could possibly find export markets. The medium-term potential, however, appears to lie with manganese, uranium, iron ore, and gold. The government has spent in excess of US\$50 million over the last ten years with bilateral assistance.

Guinea

Guinea produces close to twenty percent of the world's bauxite and reserves are almost unlimited. The country is also a high-quality (seventy five percent gem-dominated) diamond producer and there is considerable illicit gold mining which if controlled and organized could produce considerable additional revenues to government. Investment in gold exploration is on the increase and there is good potential in the greenstone volcano-sedimentary belts for both alluvial and hard-rock discoveries. There is very good geological potential to increase mining's contribution to the economy. As in many areas of West Africa (such as Burkina Faso, Liberia, and Ghana), heavy laterite cover impedes exploration. Exploration for minerals other than bauxite and iron ore is fully warranted with emphasis on new diamond and gold discoveries.

Kenya

Geologically, Kenya lies astride the north-east tip of the Tanzanian Cratons and associated greenstone-ironstone formations north of the Tanzania border. This area has produced small quantities of gold and has the only commercial scale metal mine in the country, the now closed Macalder mine. Airborne geophysical work in this and in the Kisii area led to the discovery of substantial iron sulphide deposits but expected associations with base-metals and gold were not proved. Known coastal lead-zinc deposits aligned with the Afro-Arabian geological domain have been mined in the past. Like Ethiopia, Kenya is dominated by the East African rift system and its associated volcanism and lacustrine sediments. The principal mining products of fluorite and soda-ash are associated with these events. Tin has been mined on a small scale and recent work in the north has recognized other tin potential and a possible extension of the Ethiopian (Adola) gold belt towards the Turkana region. Small amounts of clays are mined to

satisfy local industries and there is potential for graphite and vermiculite. Kenya also supports a modest gemstone industry which produces a unique green garnet (Tsavorite), rubies, sapphires and aquamarines. Kenya is the first country in Africa to produce star-sapphires (more common in Burma and Sri Lanka) but further potential is difficult to assess. Continued exploration and assessment work is justified with priorities being gold, base metals, and gemstones.

Madagascar

Madagascar contains numerous and varied mineral occurrences but on an industrial scale is only producing chromite, graphite, some non-metallics, and semi-precious gemstones. The potential for increasing chromite reserves is good. Graphite reserves are large but may lose the international market if recent massive Namibian discoveries are brought on stream. Artisanal gold mining is very active producing probably 2-3 metric tonnes per year but less than twenty five percent enters the formal economy. Copper-nickel occurrences are known and there remains potential for discovering economic deposits of this type. In the short-term the major development is likely to be the heavy mineral deposits along the east and south-east coasts where large deposits of ilmenite, monazite, and zircon have been evaluated and await development. Ornamental stones, kaolin, mica, and talc are produced on a limited scale. The island is famous for its wide variety of semi-precious stones; among them amethyst, agate, citrine, garnet and tourmaline. Numerous radioactive minerals are known and have been produced. The reserve base is difficult to assess. A very diversified mining economy could be developed once the sector is opened to private industry.

Tanzania

The mining economy of Tanzania has been dominated by one diamond mine for the last

forty years but reserve depletion has caused gem diamond output to decline from over 200,000 carats per year to less than 100,000 over the last decade. More recent developments have included other gemstones (garnet, ruby, sapphire, tanzanite) and a resurgent interest in gold, particularly in the north-west. The Kabanga nickel deposit, also in the north-west has potential. There are iron ore deposits and small coalfields in the south-west and base metals with silver have been mined in the past but geological potential is limited. The best-known industrial mineral deposit is the high quality Pugu kaolin clay. Phosphate is being mined on a small scale. Rare-earth metals associated with carbonatites (Wigu) occur but worldwide markets are easily satisfied from known low-cost sources in California and Brazil. Priority should be given to high-unit value products: the Tanzanian craton-related Nyanzian greenstones for gold, new diamond resources and other gemstones. Good geological and geophysical data exist and recompilation, interpretation and selective exploration is justified.

Category D Countries

Burundi

The government has made major efforts to develop the mining industry over the last twenty years but has met with limited success. Burundi is situated between the Kasai-Congo craton on the west and the Tanzania craton to the east. The mixed geology of metasediments and metavolcanics with a variety of intrusives is generally favorable for metallic mineralization. A large nickel-laterite was discovered in 1973 and feasibility studies pursued local peat deposits as a potential source of power for ferro-nickel production but the economics of the project are still unfavorable. Tin, tungsten, tantalum, rare-earth metals, gold, and phosphate have all been mined and some artisanal gold and tin is still produced. Recently gold exploration has been given priority and there are lesser possibilities for

diamonds. Considerable geological mapping and exploration has been financed by the UNDP and a wide range of bi-laterals organizations.

Central African Republic

Gold and diamonds are produced by about 20,000 artisanal miners. Official diamond production is estimated at US\$40 million per year and unofficial production at a similar level. There is good potential for both alluvial and hard-rock gold along the north-west extension of the north-west Tanzanian and northern Zaire greenstone belts. The possibility of discovering the original kimberlitic source of the diamonds should not be overlooked.

Côte d'Ivoire

Although much exploration has been done, the type and extent of this work has been inadequate in relation to geological potential and has only identified small gold deposits. There is a good possibility of discovering viable gold and base metal deposits along the southern extension of the favorable geology of south Burkina Faso and Mali. The discovery of viable diamond deposits is also possible. The Mount Nimba iron ore deposits on the borders with Guinea and Liberia are well documented. Some small heap-leach gold operations have recently been established.

Mali

About US\$55 million has been expended on exploration programs in Mali over the last decade. The UNDP, France (BRGM), the EEC, and Belgium have been recent major contributors. Carbonatite-held rare-earth metals are known in the north but are unlikely to contribute to the economy in the foreseeable future. Extensive exploration for uranium provided negative results. A new gold mine was recently brought into production in the south and some three metric tonnes per year are produced by the artisanal sector. There is good potential for further gold

and base-metal discoveries, and possibly diamonds.

Nigeria

The country lies astride and to the east of the major regional mobile belt between the Chad and the West African cratons. Granitic intrusives into the metamorphic basement are the source of long-exploited tin and associated metals. Tin production has suffered from declining reserves, lack of investment, low prices, and high production cost: production has halved in the last decade. State dominance has precluded development of other minerals such as lead-zinc for which reserves could be considerable. Deposits are structurally emplaced within marine platform sediments. Coal and iron-ore resources exist but are of insufficient quantity and quality to feed the Ajaokuta steel complex. Gold potential has been largely ignored but is certainly present, particularly along volcano-sedimentary greenstone sequences in the west. Priorities should be gold and base metals: continued exploration is fully justified.

Rwanda

Landlocked in the heart of Africa, Rwanda can only aspire to the production of high unit-value minerals such as gold. Traditional tin and associated metal production has declined dramatically, as in Burundi. Efforts are being made to revive the industry through cooperatives but prices and costs are unfavorable. Major gold exploration and other efforts financed by the UNDP have not led to economic discoveries although potential is reasonable. Limited continued exploration and evaluation work is justified.

Category E Countries

Benin

Most of the country is dominated by high-grade metamorphics of the Benin-Nigeria shield;

gneisses, schists, quartzites, and limited volcano-sedimentary formations. This geology is not very favorable for metallic mineralization. Placer gold has been worked in the extreme north-west and there is some potential for further placer and hard-rock occurrences. There have been efforts at producing phosphate rock for local usage without much success as the material is hard and difficult to treat. Continued limited exploration is justified.

Cameroon

Cameroon has favorable geology for the discovery of gold and base metals but to date exploration has not led to the discovery of economically viable deposits. A potential bauxite deposit is isolated with no infrastructure. There is also iron ore and rutile potential.

Chad

Since Chad is landlocked in the heart of the continent, mineral development would need to be based on high unit value products. The country is underlain by one of the three Saharan cratons but younger sediments obscure much of the basement in the center and south. Generally the geology of Chad is little known and there are virtually no mining activities. In the north, uranium, tin, gold and indications of base metals occur and bauxite is known in the south-west (Mondou). Because of debilitating politics and poor infrastructure, little mineral development can be anticipated though the potential must be considered reasonable from the technical point of view. The UNDP is almost alone in providing assistance.

Congo

Current production is limited to less than 10,000 metric tonnes per year copper, lead, and zinc concentrates, and artisanal gold. Geological potential is reasonable particularly in the north and south but much of the country is landlocked and lacks infrastructure. There appears to be

reasonable potential for gold. Iron ore occurs near the Gabon border and there is a major high-grade potash deposit in the south. Flooding of initial mine infrastructure in 1977 has prevented further production.

Guinea Bissau

The country has no mining industry to speak of and because of its size mining is unlikely to be significant. There is some potential for gold, bauxite, heavy mineral sands, and industrial minerals for local use. Recently the UNDP assisted in the design of the country's first mining code and establishment of a National Mining Fund to be financed from taxes on future production. These specialized funds have rarely been effective elsewhere.

Liberia

In relation to the size of the country considerable prospecting and exploration has been carried out, particularly for gold and diamonds. Iron-ore has dominated the mining economy and may continue to do so through the proposed Mount Nimba development with Guinea. A major mining group has recently obtained exploration rights in the north-west where there are good prospects for gold and a southern extension of the Guinea diamond fields. Much actual diamond production represents smuggled stones from surrounding countries.

Malawi

Malawi is both landlocked and is one of the smaller countries of the region. Apart from known sub-economic deposits of uranium and rare-earths, there are few indications of metalliferous deposits and geologically, prospects are poor. Mining is confined to industrial minerals and coal for local usage. More recently, semi-precious stones have become significant. Rubies and sapphires are mined at Ntchen, and aquamarine, amethyst, topaz, tourmaline and emerald at Mzimba. The resource potential for

expansion of the gemstone industry is not known. Potential exists for industrial minerals such as strontianite, monazite, corundum and vermiculite. There are numerous coal basins but seams tend to be highly faulted and discontinuous. In the Ngana, Kaporo, North Rukuru and Livingstonia areas, geological reserves are estimated at more than 500 million tonnes and measured reserves at Ngana are about fifteen million tonnes. The economics of coal for export cannot be regarded as promising but more effort needs to be placed on expansion for energy and fuel purposes. Unfortunately this is not likely to be taken up by the private sector.

Mauritania

The mining economy and reserve base of Mauritania is dominated by iron ore and with several billion tonnes of reserves iron ore will continue to dominate the economy for decades to come. Gypsum for local use is being produced on a small scale and potential exists for phosphates, rare-earth metals, and associated fluorite and barite. Several areas of gold and copper mineralization are known but only one copper-gold mine is in production despite considerable previous exploration efforts. Although potential for other base metal and gold projects cannot be rated as favorable exploration should continue at a modest level.

Niger

The country's landlocked position and poor infrastructure may limit mining development even though there is favorable geology for gold and base-metals in the southwest. This area currently produces about one tonne per year gold from small artisanal operations. Uranium in the north has dominated the mining sector to date but future market requirements are in doubt. Coal deposits are under development for local energy generation and there are possibilities for phosphate and, perhaps, diamonds. Canada, the EEC, UNDP and France (BRGM) have been recent exploration contributors.

Senegal

The Birrimian greenstone sequences which carry many West African gold and base metal deposits are extremely limited in Senegal. Despite considerable exploration, only one potential gold mine has been outlined and only about 200 kilograms per year is produced by artisanal miners. Known iron ore and heavy mineral deposits may be developed in the future if transportation issues can be resolved in an economic manner, but for some years phosphate mining will continue to dominate the sector. Potential is limited but data compilation and re-evaluation should be carried out.

Sierra Leone

Mining in Sierra Leone has meant almost exclusively diamond mining until the last decade when heavy mineral deposits were developed. Sierra Leone diamonds are characterized by the high percentage of gem quality stones and further good potential is strongly indicated. Considerable exploration work has been done for gold over the favorable greenstone-ironstone sequences but to date there have been no major alluvial or hard-rock discoveries. Numerous gold indications are however known and many have been worked on a small scale. Continued gold exploration should pay dividends. There are few indications of base metal and platinum group mineralization.

Somalia

Structurally the country forms part of the Afro-Arabian domain and is similar to eastern Ethiopia in being dominated by sedimentary rocks and superficial cover linked to the structural development of the Red Sea-East Africa rift system. The geological prediction is that Somalia is unlikely to become a major mining country. In the north and south, granitic intrusions and associated pegmatites cut the sedimentary horizons and there are some showings of gold, piezo-electric quartz which was hand-mined in the past, and secondary uranium oxide deposits. Beach

Annex 2

accumulations of heavy minerals appear to be sub-economic. Gold-bearing sand dunes have been recorded and in the northeast small occurrences of lead-zinc mineralization similar in structure and type to those of the coastal area of Kenya and cross-structure areas of Yemen are known. A large sepiolite deposit could be used for the manufacture of meerschaum products. A low-level of exploration and assessment work aimed at the industrial minerals sector is justified.

Swaziland

Swaziland lies on the edge of the Kaapvaal craton and although limited in size has varied geology which has been reasonably well explored and exploited. A major greenstone belt occurs in the north-west and as elsewhere in Sub-Saharan Africa, Karoo rocks carry all coal reserves. Asbestos, diamonds and coal are the major mineral products although diamond reserves are depleting. Coal reserves are over one billion tonnes. Present gold production is negligible but numerous gold mines have produced over the last 100 years and there is good potential for further discoveries. Gold is also present in many of the known iron-ore deposits. More priority should be accorded gold exploration and evaluation work.

Togo

The mining sector of Togo has been dominated by phosphate but exports to Europe will become increasingly difficult because of the

ore's high cadmium content. Phosphate reserves are sufficient for thirty years at the present production level (3.5 million metric tonnes per year) and this activity will continue if cadmium levels can be reduced and downstream processing to produce phosphoric acid and tri-sodium phosphate established locally. A potentially favorable mobile belt for gold and possibly base metal mineralization is recognized but exploration has been limited. Limited iron-ore reserves may be developed and there is some potential for chromite. On-going exploration to diversify mineral potential is fully justified. The UNDP and France (BRGM) have been major recent contributors to exploration activities.

Uganda

The Kilembe copper-cobalt mine dominated the sector until its closure in 1977. Considerable reserves remain but economic viability is doubtful. The only other previous semi-mechanized metal mining operations were for tin and tungsten which occur in scattered deposits of limited tonnage. This type of deposit does not bode well for a revival. Small-scale gold mining exists and there is reasonable potential for the discovery of commercial-scale deposits. A major salt project has so far failed and the economics of phosphate mining for the production of fertilizers using iron sulphides from Kilembe seems doubtful because of marketing and high transport and infrastructure costs. Continued exploration, data compilation and evaluation work is, however, fully justified.

INVESTMENT ENVIRONMENTS FOR MINING IN SELECTED COUNTRIES

BOTSWANA

Overview

The Minerals Act of Botswana gives discretionary powers to the Minister but these are circumscribed so that permissions may not unreasonably be withheld. This discretion does however provide a great deal of flexibility which has worked well so far. The general stability of the regime and a successful track record provide an attractive investment environment. Liberal exchange controls permit repatriation of income and capital and importation of necessary capital goods and consumables.

All mineral rights are vested in the state. Mineral rights are distinct from surface rights. Foreign and domestic companies may obtain rights to prospect, explore, and mine for all major minerals, excluding construction materials and industrial minerals. Major investments are generally made under special Investment Agreements negotiated during the application for a Mining Lease. There is no separate investment code but the constitution protects property against forfeiture without payment of prompt and adequate compensation.

Mineral Licenses

There are three types of mining concession: a **Reconnaissance Permit**, a **Prospecting License**, and a **Mining Lease**. A **Reconnaissance Permit** is a general prospecting license valid for one year which grants no automatic subsequent exploration and production rights.

A **Prospecting License** gives an exclusive right to obtain a **Mining Lease** provided all requirements have been met. The license is exclusive for specific minerals in a specific area but can be amended to include other minerals. It is valid initially for three years and is renewable twice for two-year extensions. Maximum size of license area is 1,000 km² which must be reduced by at least half on each renewal unless otherwise authorized. Heavy work and reporting requirements are laid down and the licensee must comply with minimum expenditures specified. Any shortfall is considered a debt to the government.

A person or company must hold a **Prospecting License** before being eligible for a **Mining Lease**. There is no limit on size of mining lease but it must be within the prospecting license and may be enlarged if necessary. Leases are for an initial twenty-five years and may be renewed. Both **Prospecting Licenses** and **Mining Leases** are transferable with the Minister's approval. His approval is also needed for any change in ownership of a voting right, or financial interest of over 20 percent.

Taxation

There is no discrimination between local and foreign investors. Special fiscal agreements can be negotiated in investment agreements and tax losses may be carried forward indefinitely.

Government Free equity interest in all new
Equity: mining projects of 15 to 25

percent plus board representation. Management is left to the private investors. The exact terms of participation are negotiated when applying for the Mining Lease, along with any special fiscal provisions which may be established in the investment agreement. Although this leads to some uncertainty, in practice investors can anticipate the terms they are likely to receive.

Income Tax: 40 percent.
Depreciation: Over life of mine.
Royalties: Range of 3 percent on base metals to 10 percent on diamonds.
Withholding Tax: 15 percent.
Import Duties: Up to 25 percent on imports from outside the Southern Africa Customs Union.

CHILE

Overview

Chile has been the most successful of the countries surveyed. The economy is completely free and there are virtually no restrictions on foreign exchange. Foreign investment is permitted under general legislation and there is no discrimination between local and foreign private investment. Neither is there a specific law governing investment in mining. The Foreign Investment Law DL600 of 1974 is applicable to investment in all fields and provides additional assurances to the investor. Its provisions need not be utilized. Some investments have also been made by way of debt or equity swaps but there is now less debt available and the high quotation of Chilean debt on the secondary market has reduced the financial incentive.

All mineral rights are reserved by the state. Surface and mining rights are separate, and mining rights have all the attributes of

property rights, being freely mortgageable, transferable, and protected by the constitution against confiscation.

Although not obligatory, most foreign investment in mining has opted for the security granted by the Foreign Investment Law DL600. The law allows investors the option to fix by agreement, the legal and fiscal regime applicable to their projects, and ensure access to necessary foreign exchange. Capital may be repatriated after three years and profits at any time. Under the contract, the investor elects either to fix the total annual income tax burden for ten years at 49.5 percent, or to be taxed under the prevailing income tax rate (now 32.5 percent) which may vary over time according to the prevailing law. The investor has the right to change to the alternative arrangement one time during the contract life. In practice, it appears that most if not all mining companies have initially selected the fixed rate option and subsequently changed to the lower variable local rate once their projects started making profits.

Mining Licenses

The Mining Code recognizes **Prospecting, Exploration, and Production**. Prospecting is open to all persons on any land not covered by an exploration or production concession subject to payment of compensation to the landowner. This promotes prospecting but protects landowners. An **Exploration Concession** is for all minerals found and only the holder of an Exploration Concession may apply for a **Production Concession**. Concessions may be up to 5,000 ha in area and are granted for two years renewable once only on half the area. Production Concessions are 10 ha only. However, there is no limit on the number of exploration or production concessions that may be held provided annual fees are paid.

The procedures for granting and transferring the various types of concession are based on technical criteria and so are insulated from the potential arbitrariness of bureaucratic

discretion. Applications are reviewed by the Mining Technical Service, which makes recommendations, and granted by a judge. All disputes are settled in the courts.

Taxation

Effective income tax rates are lowest of all countries considered in this study, especially in the light of liberal rules on depreciation, amortization, and carry-over of losses. Taxes are levied only on the distribution of profits or dividends, not retained earnings. This rewards reinvestment.

Government Equity: No requirement.

Income Tax: First Category Tax of 10 percent after which the remaining taxable income is taxed at 35 percent. Payment of First Category Tax creates a credit against the additional tax resulting in a net effective income tax rate of 32.5 percent. Tax losses may be carried forward indefinitely.

Depreciation: The investor can choose between standard and accelerated depreciation schedules and can also amortize all organizational, start-up, and research and development costs relatively rapidly. There is no depletion allowance but a proposal is going through Congress to allow the purchase price of mining properties to be depreciated over the life of the mine.

Royalties: None.

Withholding Taxes: 40 percent on payments to foreign entities for use of trade marks, and other technical

knowledge. 20 percent on payments for technical assistance.

Import Duties: 15 percent plus 18 percent Value Added Tax (VAT). Capital goods imported under investment agreements are exempt from VAT. Customs duties on capital imports may be paid in installments over seven years.

GHANA

Overview

The Minerals and Mining Law of 1986 allows foreign companies and partnerships registered in Ghana exclusive rights to prospect, explore for, and produce minerals, with the exception of construction materials and industrial minerals. The law also guarantees access to foreign exchange and establishes a special fiscal regime, which is more generous than the general tax regime. Most mining investments take place through an *Investment Agreement* (the *Deed of Warranty*). Mining leases are granted by the Secretary for Lands and Natural Resources on advice of the Minerals Commission.

The Secretary is authorized to exercise some discretion regarding mining rights. In case of dispute, the Mining Lease and Deed of Warranty provide for international arbitration. Special permission to remove minerals from the lease and separate export licenses are needed. The government retains first right to purchase minerals. In practice, the marketing arrangements are submitted for approval by the Bank of Ghana and the Minerals Commission and have usually been approved as part of the overall financing package.

A number of mining agreements have been concluded in recent years and procedures are becoming more formalized as Ghana builds up a successful track record.

Mining Licenses

The Mining Law specifies that mineral deposits are owned by the State and grants power to the Secretary of Lands and Natural Resources to negotiate, grant, revoke, suspend, and renew licenses and mining leases. Applications for **Reconnaissance Licenses**, **Prospecting Licenses**, and **Mining Leases** must all be accompanied by statements giving particulars of the financial and technical ability of the company, estimates of expenditure, particulars of the program, and plans for the employment and training of Ghanaians.

A **Reconnaissance License** has no size limit and may be exclusive or non-exclusive. It excludes, drilling, trenching, and other sub-surface techniques. A **Prospecting License** can cover up to 150 km² and is valid for a maximum of three years, renewable for an unlimited number of two-year extensions. At each renewal the area is reduced by half. The license carries extensive work obligations and the expenditure agreed must be spent. The license is exclusive for the minerals specified but can be amended to include other minerals.

A **Prospecting License** holder has the automatic right to a **Mining Lease** but the law gives the Minister some discretion as to the terms of the lease. The maximum size of a mining lease is 50 km² but three leases totalling 150 km² may be held. Leases are valid for up to thirty years and are renewable at the Minister's discretion. Generally the initial lease agreement includes a clause providing for lease renewal.

Taxation

Ghana's tax regime includes a combination of income taxes, sliding-scale royalties based on the companies' operating performance and for extremely profitable projects (with an after-tax return of 35 percent or more), **Additional Profits Tax**. In addition, the government takes 10 percent free equity.

There is a liberal foreign exchange regime; companies are permitted to retain up to 80 percent of their foreign exchange earnings in overseas accounts; exemptions from import duties for mining equipment and supplies and depreciation allowances are generous.

Government Equity:	Free 10 percent with an option to purchase a further 20 percent on terms to be negotiated.
Income Tax:	45 percent. Additional Profits Tax at 25 percent is applied to after tax income once the capital has been repaid and the project reaches a return on investment of 35 percent. Losses may be carried forward but are limited to the value of capital allowances for the period.
Depreciation:	75 percent in the first year and 50 percent on the balance thereafter.
Royalties:	3 to 12 percent depending on the operating ratio (defined as net cash flow divided by gross revenues—where net cash flow equals gross revenues minus interest minus cash operating costs) for the company. In practice close to 3 percent.
Withholding Tax:	Nil.
Import Duties:	Mining equipment and supplies are exempt.

INDONESIA

Overview

Indonesia's regime for foreign investment in mining is a prime example of a regime with extensive governmental regulation, in that mining companies sign **Contracts of Work (CoW)** with the state and essentially act as "contractors" mining on behalf of the state.

Ownership of minerals is vested in the state which regulates all aspects of mining in great detail. The Foreign Investment Law establishes the basic pre-requisite guarantees of private property protection and access to foreign exchange.

CoWs provide the investor with a clear definition of rights and obligations, including financial burdens, and also guarantee access to foreign exchange, land, markets, and protection against adverse changes in the laws. Indonesia has built a positive track record with mining investors in that all CoW arrangements have been fully respected by the government. All factors affecting the investment are set out in the CoW at the outset and it therefore represents a convenient "one-stop" foreign investment agreement with the government.

Mining Licenses

The CoW authorizes the investor to proceed through the various stages of minerals development from prospecting to sales. There are five successive stages: general survey, exploration, feasibility study, construction, and operation.

A **General Survey** (prospecting) concession is valid for one year renewable for an additional year, and entitles the holder to priority in applying for an **Exploration License**. The general mining legislation stipulates a maximum area of 25,000 ha but under a CoW it can be over 1.5 million ha. Minimum expenditure of \$45/km² is required and the contractor may proceed directly to the exploration phase on interesting areas while leaving the rest under general survey.

An **Exploration License** grants the contractor exclusive rights to explore and evaluate minerals in the reduced contract zone for up to three years and rights to proceed to mine. Expenditure of at least \$450/km² is required coupled with significant reporting and relinquishment obligations. A one-year feasibility study stage follows automatically,

extendible for a further year if necessary. Construction follows immediately and must be completed in the time stipulated. The initial mine operating period is thirty years but this can be extended.

Taxation

The liability of the contractor for all taxes, duties, rents, royalties, fees, and other charges are spelled out in detail in the CoW which locks in income and withholding taxes for the life of the agreement. The CoW grants exemption from import duties on capital goods and postponement of VAT on a range of goods. From time to time modifications have been made to the fiscal terms and incentives available to investors in successive "generations" of CoWs. While the general terms are outlined here, additional incentives apply to investments in those remote areas designated as "frontier zones." Coal mining takes place under production-sharing arrangements which are quite different from the CoWs for non-fuel minerals.

Government Equity:	Although the government does not insist on an initial equity stake, the contractor is obliged to offer shares up to 51 percent ownership to the government or to private Indonesian parties over a period of ten years.
Income Tax:	15 percent on profits up to US\$5 million, 25 percent on profits of US\$5-30 million, and 35 percent above US\$30 million (approximate current values). Losses may be carried forward for eight years.
Depreciation:	25 percent of the declining balance.
Royalties:	Payable on most exported minerals. Precious metals average 1 to 2 percent.
Withholding Taxes:	20 percent to non-residents. 15 percent to residents.
Import Duties:	Average 10 percent.

PAPUA NEW GUINEA

Overview

Although Papua New Guinea has a detailed mining law, a special mining tax law, and a foreign investment law, a supplementary **Mining Development Agreement** is required for commercial-scale mine developments. The investment regime protects foreign investors against expropriation and guarantees rights to remit earnings, capital, and certain expenses in foreign exchange. Unlike Indonesia, however, it does not protect investors against adverse changes in the fiscal regime. The developer is authorized to maintain foreign exchange in a bank account outside PNG sufficient to cover three months obligations.

Ownership of minerals is vested in the State and a foreign mining company carries out prospecting and exploration on its own under a **Prospecting Authority** from the government. Once a potentially commercial deposit is identified, an extensive and detailed process of coordination with the Department of Minerals and Energy begins. This culminates in the negotiation of a **Mining Development Agreement** and a sale to the government of a 10 to 30 percent equity interest. The government pays for its 10 to 30 percent interest with cash up front. Under new arrangements agreed in 1990 and 1991, approximately half the government interest will be ultimately farmed out to local governments and landowners. Both the participating terms and development agreement are negotiated simultaneously. The process involves tripartite negotiations and contracts between the developer and the national government; the developer and the provincial government and landowners; and the national government and the provincial government and landowners.

Mining Licenses

The Minister has considerable discretion in the issuance of **Prospecting Authorities** and **Mining Leases**. The **Prospecting Authority**

confers the right to prospect for gold or other specified mineral on an area up to 25,000 km² for a term of two years. An unlimited number of two-year extensions may be granted subject to reductions in area of 50 percent each time to a minimum 250 km². An annual fee is payable.

There are three types of mining lease: a **Gold Mining Lease**, a **Mineral Lease**, and a **Special Mining Lease**. In practice, a **Special Mining Lease** is nearly always issued. The law forbids the leaseholder to transfer, sublet, or mortgage his lease without the consent of the Minister, but this may not be withheld unreasonably. Unique infrastructure obligations exist whereby the state reserves the right to finance any project infrastructure (including administrative buildings, housing, mining and processing facilities, and roads) and to charge the developer provided it can agree reasonable finance costs with the government.

Taxation

PNG pays for its government participation and is one of a handful of countries to levy an **Additional Profits Tax**.

Government Equity:	10 to 30 percent paid for up front.
Income Tax:	35 percent. Once the investor has recovered the cost of investment plus an after tax rate of return of about 20 percent, Additional Profits Tax at 35 percent also becomes payable. Losses may be carried forward for up to seven consecutive years following the loss.
Depreciation:	Generous. The investor can elect between standard and accelerated schedules.
Royalties:	1.25 percent of the fob or net smelter return value.
Withholding Tax:	17 percent.
Import Duties:	7.5 to 10 percent. There is no deferment of payment during construction.

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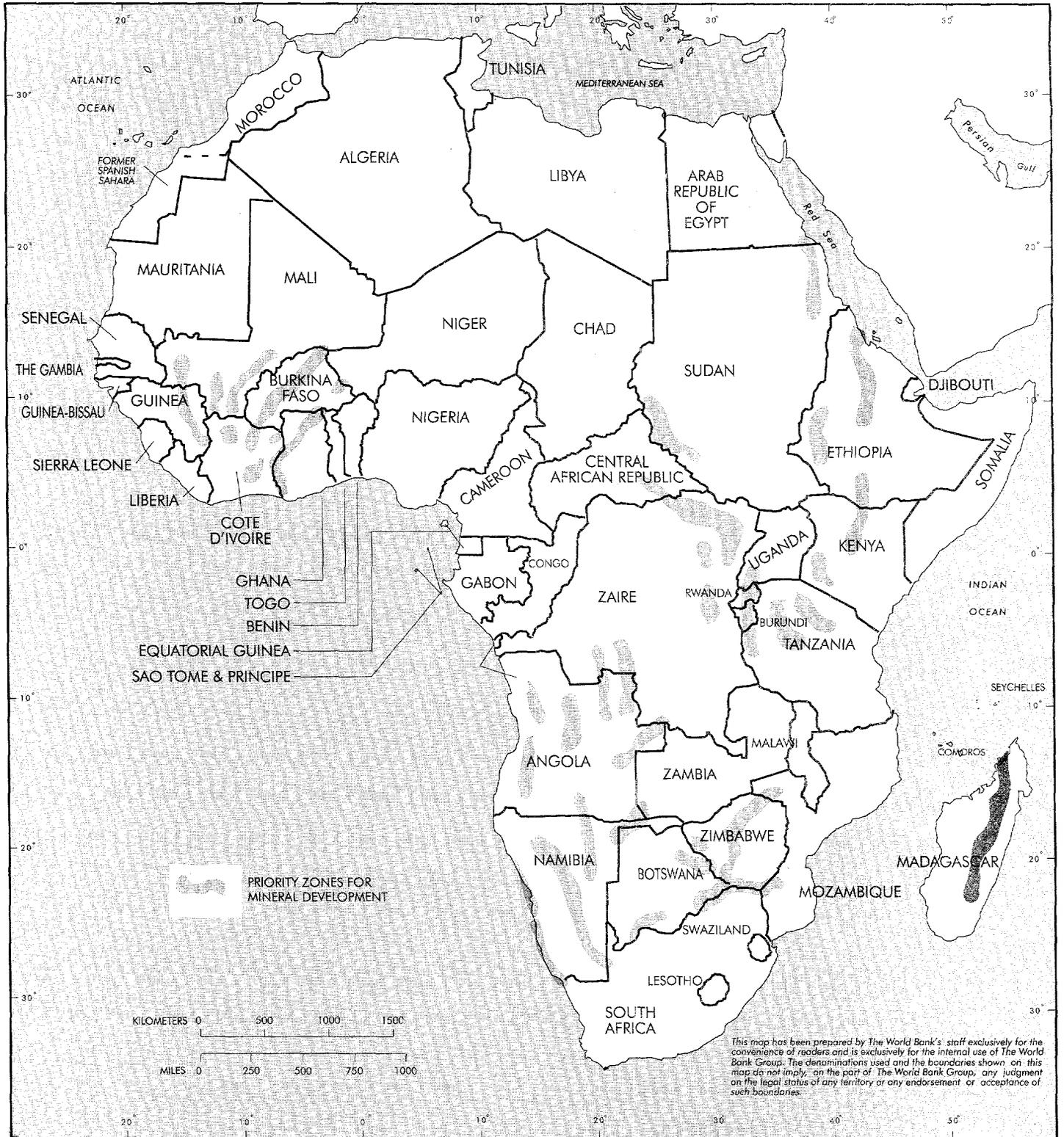
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