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A Mining Strategy for Latin America and the Caribbean

Industry and Mining Division
Industry and Energy Department

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FOREWORD

Mining has taken place in Latin America and the Caribbean (LAC) for many centuries. The region is well endowed with mineral resources and is a major producer of aluminum, bauxite, copper, gold, iron ore, lead, silver, tin, and zinc to name but a few minerals. Today, commercial mining activities are found in practically all countries of the region and mining is a major economic activity in six countries - namely, Bolivia, Chile, Guyana, Jamaica, Peru and Suriname - where it provides over 25% of export revenues. Commercial mining is also important to the economies of Brazil, Colombia, Cuba, Mexico and Venezuela. Small-scale and artisanal mining take place in over twenty countries and provides livelihood for over half a million miners and their families.

Mining development in LAC lagged in the 1960s and 1970s when many countries adopted a statist approach, nationalizing foreign-owned operations, restricting private sector access to land for mineral exploration and development and subsidizing public sector operations to the detriment of the private investor. But the situation has changed in the past decade. The economies of many countries have been liberalized, parastatal companies have been privatized and foreign investors have been encouraged to invest in the sector. Important changes have been taking place in the mining sector. Chile, which began reform a decade ahead of the others, has taken the lead, attracting several billion dollars in private investments. Argentina, Bolivia, Ecuador, Mexico and Peru are in the advanced stages of reform - and many state mining enterprises have been privatized, especially in Mexico and Peru.

These reforms have been successful in generating substantial interest in attracting exploration to the region which, for the first time in 1994 and 1995, was ranked as the first region in the world in terms of mining exploration expenditures. The challenge is to see the present reforms deepened and sustained so that, in many countries across the region, the present exploration boom leads to investment in new projects in which investors are adequately rewarded, host countries retain a fair share of the benefits, and where best practices are followed for environmental protection and social development.

This report has been prepared to assess the current state of the mining industry in the region, to identify and analyze constraints to its growth, to propose approaches to implement the required framework, and to extract lessons from the ongoing reforms which may apply in LAC or any other region of the world. The report is addressed to Government officials, donors, academics, the development community at large and investors themselves. It is largely based on work carried out by the World Bank Group. Chapters 1, 2 and 3 examine the significance and structure of the industry, the legal and fiscal frameworks, and the institutional arrangements as they exist in LAC. Chapters IV and V deal with local medium and small mines, and with environmental and social concerns, with special emphasis on countries where the World Bank Group has, or has had in recent years, a significant work program in mining - namely, Argentina, Bolivia, Chile, Ecuador, Mexico and Peru. The modest coverage of Brazil, which has the largest

mining sector by value of production of any country in LAC, reflects the limited scope of World Bank Group activities in the Brazilian mining sector in recent years; there is no assessment of Cuba for similar reasons.

This report proposes a framework for achieving mineral sector growth that consists of four main elements - establishing a modern and competitive legal and fiscal framework for the sector; reforming public mining institutions; encouraging medium and small mining development; and addressing environmental and social impacts. If successfully adopted, these measures should lead to a sustained expansion of environmentally acceptable mineral sector growth so that the sector can make a progressively greater contribution to economic activity, employment and income in the Region well into the next century.

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TABLE OF ACRONYMS

ADR	American Depository Receipt
AFP	Pension Fund Administrating Agency
AM	Artisanal Miners
AMAX	American Metals Climax
ASARCO	American Smelting and Refining Corporation
BAT	Best Available Technology
CFM	Comisión de Fomento Minero
COMIBOL	Corporación Minera de Bolivia
CVG	Corporación Venezolana de Guayana
CVRD	Companhia do Vale do Rio Doce
DM	Department of Mines
EA	Environmental Audit
EGI	Environmental Government Institution
EIA	Environmental Impact Assessment
EMS	Environmental Management System
FFM	Fideicomiso de Fomento Minero
GAN	Grupo Acerero del Norte SA de CV
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GS	Geological Survey
ICSID	International Convention on the Settlement of Investment Disputes
IDB	InterAmerican Development Bank
IMMSA	Industrial Minera México SA de CV
ISM	Informal Mechanized Operators
LAC	Latin America and the Caribbean Region
LAN	Local Area Network
MB	Mining Bank
MCO	Mining Cadaster Office
MEDM	Medium Miners
MEO	Mining Environment Office
MI	Mines Inspectorate
MIGA	Multilateral Investment Guarantee Agency
MIS	Management Information System
MM	Ministry of Mines
NAFTA	North American Free Trade Agreement
N/H	Non-Traditional/High Development Level Countries
N/L	Non-Traditional/Limited Development Level Countries
NGO	Non Governmental Organization
OPIC	Overseas Private Investment Corporation
PAMA	Environmental Management Program
PC	Personal Computer
PMI	Public Mining Institutions

PPO	Oruro Pilot Project
SA	Social Assessment
SAR	Synthetic Aperture Radar
SEA	Sectoral Environmental Assessment
SM	Small Miners
SOE	State-Owned Enterprise
TA	Technical Assistance
TH	Traditional/High Development Level Countries
TL	Traditional/Limited Development Level Countries
UTM	Mercator Universal Transverse Projection
VAT	Value-Added Tax
WAN	Wide Area Network
WHO	World Health Organization

EXECUTIVE SUMMARY

This report looks at specific policies which could result in the sustainable development of the mining industries in the countries of the Latin American and Caribbean region (LAC). The report highlights the importance of the mineral sector to individual national economies of the region, and how the World Bank has been and can continue to assist governments in formulating policy to encourage an environmentally and socially acceptable private-sector-led mining industry.

The LAC region is emerging from a prolonged period of economic nationalism when primary industries in many countries were often state-owned, barriers to imports and often exports were high, and macroeconomic policies were unstable and often hostile to private investment. High rates of inflation and multiple exchange rates were common. The trend towards open economic policies is progressing at different rates in different countries and is being accompanied by a parallel liberalisation of mining policies. Most governments have now become committed to creating the enabling investment environment needed to attract private capital, both local and foreign, into their mining industries.

The enactment of the necessary legal, fiscal, and environmental policies and the establishment of strong mining institutions to implement and administer them have proven to be the keys to success. Until such clear and non-discretionary regulations and adequate institutions are in place, confidence will not be generated and investments will go elsewhere. The World Bank has been active in helping governments in the formulation of these necessary policies and regulations. Loans and technical assistance credits have been provided to five LAC countries - Argentina, Bolivia, Ecuador, Mexico and Peru (the "reforming countries") - for reforms which include the modernisation of their mining laws, environmental provisions, fiscal arrangements and public mining institutions (PMI). In some instances support was given to the privatisation of state-owned mining enterprises.

Successful macro-economic and sectoral reforms have led to increased private investment in exploration and mining in several LAC countries. Investment in exploration in the region has gone up about 130% in the last five years from about US$300 million/year to about US$700 million/year. Most significantly, if Chile, which reformed about a decade ahead of the other countries, is excluded from the statistic, the growth is five-fold. Most noticeably, the growth is concentrated in those countries which have reformed their mining policies, especially Argentina, Bolivia, Mexico and Peru. In 1994 and again in 1995, for the first time in history, Latin America was listed as the first region of the world in terms of exploration investment.

The important thing now is for this exploration boom to be converted into sustainable mining development. This will require follow-through on the work already done on policy formulation and implementation so that mining becomes a sustainable activity over the long term. The reform process is still only weakly embedded in the legal and institutional framework governing the industry in the region and there is a danger of stagnation or backsliding. Exploration successes will not necessarily translate into mines, related industries, employment and the increase in national wealth if the requisite conditions are not in place.

In other countries of the region much remains to be done. Several issues still hinder sustainable growth of the sector. Among them are the fragile nature of some of the macroeconomic reforms, the continued existence of legal and regulatory impediments in some countries, the weakness of public mining institutions, the constraints on the growth of the small and medium mining sectors, and the inadequate treatment of the environmental and social aspects of mining.

The world mining industry is currently undergoing a major expansion. Metal prices are higher than they have been for many years due to increased consumption, particularly in Asia. Substantial changes on the supply side have also contributed to fuelling mining investment. There are now better opportunities than there have been for decades for making major discoveries. This is due to greatly improved exploration techniques and the opening to foreign investment of many countries with high geological potential. Many of the LAC countries are among these, and others could enter their ranks, but to take full advantage of the improved outlook they must provide the necessary enabling environment and be competitive with countries elsewhere in the world.

The existence of a cadre of "junior" mining companies with the expertise and drive to take advantage of the new opportunities and the availability of risk capital for mining are other necessary factors. Junior mining companies have become an important part of the world mining industry. Many were formed as a result of the gold boom of the early 1980s and until recently have almost exclusively pursued gold. However, the flat gold price and the rise in prices of base metals are encouraging some of them to diversify. Generally, the juniors are the leaders in the exploration end of the industry and bring in major international companies as partners when a significant prospect is found.

A further factor is that the development of capital markets prepared to invest in mining, such as the Vancouver and Toronto stock exchanges, has made financing exploration and mining projects easier than in the past.

KEY CONCLUSIONS

The concept of a sustainable mining industry may seem paradoxical because one is talking about the exploitation of a finite resource. However, although an individual orebody is finite, mining as an activity is sustainable. This is amply demonstrated throughout the world where orebodies are exhausted and replaced by new ones, often in the same mining district. In many cases, great orebodies last many decades and have given rise to towns and cities which have in turn developed industries creating sustainable development for their citizens. Regrettably, in some cases however, this has not happened and the result has instead been an unsightly and sometimes dangerous environmental legacy. For mining to be sustainable, attention must be given to the full cycle. Mine closure, environmental matters and follow up activities must be considered at an early stage.

The LAC countries are currently enjoying an exploration boom and it is important that this be converted into sustainable mining development. The establishment of an "enabling environment" for private investment in mining, both foreign and local, is discussed in detail in this report

The main conclusions can be summarized as follows:

LEGAL AND FISCAL ASPECTS OF MINING REGULATION

The main prerequisites for mining sector reform are a clear and effective legal framework which is necessary to govern the activities of the mining sector and protect the interests of both the state and the investors. The most successful mining law regimes are grounded in modern legislation based on clear constitutional authority. All successful frameworks incorporate the following five broad requirements:

In the Legal Regime:

- Security of Tenure, which means that the mineral rights[1] holder has secure mining title to his concession, that he is able to transfer the title to any eligible third party, and that he is permitted to mortgage the title to raise finance or other purposes;

- Clarity and Transparency, which means that the Mining Code specifies explicit requirements and procedures for obtaining, maintaining and terminating mineral rights. Discriminatory eligibility criteria for the holding of mineral rights should be eliminated; and,

- Access to Mineral Resources, which requires that the state release all land it may have reserved for exploration and development by parastatal companies, and that investors be assured of access to land for exploration and exploitation under clearly defined conditions, which are not unduly onerous. A modern mining cadaster which provides an accurate record of the geographical location of concessions, their nature and time validity, together with a sound policy on surface rentals is absolutely essential to ensure and monitor this access.

In the Investment Regime:

- Access to Foreign Exchange at market rates for the purchase of essential imports, repayment of loans and repatriation of profits. This implies the elimination of exchange controls and the freedom to export and sell mineral production at world prices; and

- A Stable and Equitable Tax Regime. Investors need the assurance that the taxes on which they have based their economic evaluation will not change significantly over the life of the project, and that they will be similar to those imposed in comparable countries. Ideally, this requires income-based taxation with no or minimum royalties; no or low taxes on the importation of mining equipment; arrangements for off-setting asset taxes and mandatory profit sharing, where applied; and an adequate mechanism for obtaining VAT refunds on inputs.

[1] Throughout the report, the term "mineral rights" is used to refer to the right to explore for and extract minerals. Rights to extract hydrocarbon minerals, i.e. oil and gas are excluded from consideration in this report.

Other factors affect a country's attractiveness for foreign and local investment but any country whose mining and investment regimes do not encompass these five points will have difficulty in attracting investment in its mining sector.

REFORM OF THE PUBLIC MINING INSTITUTIONS (PMIS)

Modern and effective PMIs with clear mandates, responsibilities and authorities are essential if governments are to encourage a private-sector-led mining industry. Strong PMIs, with adequate human resources, financial resources and management quality are needed to administer and enforce the new policies. A properly implemented civil service reform will usually be required to enhance the ability of the PMIs to perform their functions. It is important to note that the environment in which they will have to operate is different from that which prevailed when the PMIs in many LAC countries worked primarily to meet the needs of state-owned mining enterprises.

Under the new policy, government is required to define clear policies and regulations for the mining sector, to promote private initiatives and investments, to administer mining rights, to provide basic geological information, and to help ensure that mining development is environmentally sustainable. Exploration, development, production and mining services, which previously were often performed by the PMIs, are left to private enterprises.

For countries with established mining industries and well-developed civil services, the Mining Sector Institutions should have a Ministry or Department of Mines to act as the political head. Under the Ministry or Department of Mines there should be a Mining Cadaster Office to administer mining rights, a Geological Survey to provide earth science information, and a Mining Environment Office to ensure, either directly or in co-ordination with a national multi-sectoral agency, sound environmental performance.

ENCOURAGING THE MEDIUM AND SMALL MINERS

A fundamental aspect of mining sector reforms is that they should not discriminate between foreign and local investors. It is therefore equally important that they should encourage the development of a local mining industry. This is partly because the existence of a local mining industry can be considered a good thing in itself but also because the major international mining companies are usually only prepared to devote time and resources to major deposits. They are not usually interested in the smaller orebodies which they often find in looking for larger deposits. Local miners have traditionally excelled in the exploitation of these smaller, often more complex orebodies. Therefore, in the absence of a strong local mining industry a country's mineral resources are unlikely to be fully exploited.

The report examines the status and structure of local private mining companies in the LAC region. It looks at the importance of the sector in different countries, discusses ownership and

management issues and analyses the constraints under which the sector has had to operate, and in some respects still does operate. These include the availability of trained managerial and technical personnel, and access to credit and capital. Finally, it considers what policies could usefully be adopted to promote the development of existing mining companies and encourage the formation of new ones.

It is concluded that there is a need to develop local capital markets as a source of equity funding; to make local banks aware of, and knowledgeable about, the opportunities for making loans to properly managed mining ventures; to increase foreign direct participation in the sector thereby introducing new technologies and training local professionals for subsequent roles in medium and small mining; to strengthen the management and technical training related to mining in local educational institutions; and to foster an entrepreneurial spirit in the local mining community.

ENVIRONMENTAL CONCERN

Sound environmental performance is an essential element of sustainable mining development. Environmental considerations are today obligatory elements in mining ventures and those countries with modern regulations and competent environmental regulatory agencies have an advantage in the attraction of new investment, especially by the most qualified firms. The absence of clear environmental and social policies and compliance standards will be a disincentive to mining investments, particularly as the international banks and assistance organizations are increasingly demanding rigorous environmental and social conduct, including consideration for local communities and indigenous populations in mine planning and operation.

Adequate regulations and competent agencies are needed to provide detailed rules and standards of reference to monitor enterprise performance, to identify and correct unacceptable environmental and social performance, to ensure compliance with required standards, to introduce necessary mitigation and remediation efforts, and to integrate local communities into projects. It is the responsibility of governments to provide this framework. Environmental performance within the mining sector of the LAC countries varies immensely and there is considerable scope for improvement.

One of the most important issues discussed is the "sectoral" versus "integral" approach to environmental supervision, i.e., whether environmental management should be entirely in the hands of a central Environment Ministry (the integral approach) or whether each economic sector should have its own environmental office (the sectoral approach). The report concludes that the integral approach, through an environmental government institution (EGI), not tied to any sector, which forms part of the development planning scheme, is the most preferred solution to this dilemma. However, in those countries with an active mining industry which have yet to develop their environmental management organisations, the sectoral approach with an environmental office within the Ministry of Mines provides a practical scheme to start the environmental work. The participation of the sectoral ministry provides a better understanding of the mining-specific issues involved and access to the technical expertise necessary for adequate oversight of mining environmental performance. Once the basic instruments and procedures are in place, movement

towards an integral or mixed approach, where sectoral offices are co-ordinated by a national central authority, is recommended.

MOVING FORWARD

This report is based on detailed studies of six LAC countries: Argentina, Bolivia, Chile, Ecuador, Mexico and Peru, and the World Bank Group's experience elsewhere on the continent and the world. Mining sector reform is a complex and time consuming process. Several years are typically required to ensure that the correct policies become durably embedded in the legal, institutional and administrative framework governing the industry. However, successful mineral sector reform is essential so that mining can grow in a sustainable, environmentally and socially acceptable manner and increase its contribution to the national wealth of the LAC countries concerned.

Progress has been made in several countries regarding overall macro-economic and mining sector reforms to establish favourable conditions for private mining development. Chile, and to a lesser extent Peru, can be considered success stories. Argentina, Bolivia, Ecuador, Mexico and several other countries are well down the reform road and are seeing significant increases in mining investment. However, further government initiatives are required to complete their legal framework and, most importantly, to develop the institutional capabilities to ensure that private mining growth is sustainable. This institutional modernisation is now the key issue, to complement macro-economic and sectoral policy consistency, in order to achieve effective and durable mining sector reform in the region. There is a need for governments to develop adequate information systems, as well as monitoring and enforcement capabilities to administer the mining rights, supervise the mining sector and ensure environmental protection. This will require a sustained effort by governments, the World Bank Group and the donor community.

The World Bank Group can assist LAC countries address these key sustainability issues through the support of macro-economic, legal, institutional and environmental reforms as well as providing financing and guarantees for mining projects. The Bank Group can facilitate the exchange of experience and the dissemination of best international practices. It also has the ability to provide seed capital and to draw on the financial support of other donor agencies for mining sector reform and development.

CHAPTER I: SIGNIFICANCE AND STRUCTURE OF THE INDUSTRY

A. INTRODUCTION

The structure of the mining industries of the Latin America and Caribbean region (LAC) varies between countries, in the minerals produced, the size of operations, the types of mining, and in the form of ownership involved. In size, operations range from artisanal workings to major enterprises treating tens of thousands of tons a day. In type they encompass the three main types of mining: alluvial, open pit and underground. Ownership is divided among state owned enterprises, major international groups, either alone or with local partners, and local private concerns which are often family owned but occasionally public companies.

Mining is a major economic activity in six countries of the LAC region - Bolivia, Chile, Guyana, Jamaica, Peru and Suriname. As the table below indicates, all these countries derive between 5% and 50% of their GDP and over 25% of their export revenues from the industry. Mining is also significant in Brazil, Colombia and Mexico but in these countries it represents only a small percentage of GDP.

Table I.1: Economic Significance of Mining in Selected LAC Countries

MINERAL PRODUCTION IN LAC COUNTRIES			
Country	**Value of Mineral Production 1994 (US$ million)**	**Share of Mining in the 1994 GDP (%)**	**Share of Mining in 1994 Exports (%)**
Argentina	150	<1	<1
Bolivia	450	5-10	25-50
Brazil	6000	1-5	5-10
Chile	5600	10-25	25-50
Colombia	1500	1-5	10-25
Ecuador	120	<1	1-5
Guyana	200	25-50	>50
Jamaica	610	10-25	>50
Mexico	2800	<1	1-5
Peru	2120	5-10	25-50
Suriname	300	25-50	>50
Venezuela	800	1-5	1-5
Source: Mining Annual Review and World Bank Staff Estimates			

In many countries such as Bolivia, Chile, Mexico and Peru, a locally owned and operated mining industry is relatively well developed and plays a significant role in the national economy. However, in most countries development of local Medium and Small Miners[1],

[1] A full definition of Medium and Small Miners is contained in Chapter IV which specifically addresses this sub-sector.

has been severely constrained by the circumstances under which it has had to operate during the last quarter century of nationalistic political and economic policies, and the dominance of state-owned mining enterprises. This situation is only now improving as mining sector reform gathers momentum in LAC.

B. THE COUNTRY GROUPS

The following are brief summaries of the economic importance of mining, the structure of the industry, and the need for continuing reform in each of the countries mentioned in the table. The stage of reform varies considerably with some countries more advanced in some aspects. The countries can be divided into four groups:

1) Chile, which began reform a decade ahead of the others, is very close to completion of its reforms, except in the environmental sphere.

2) Argentina, Bolivia, Ecuador, Mexico and Peru, all of which are well advanced in the reform process but all of which require, to greater or lesser degrees, continuing efforts to complete the process and ensure that the reforms become sustainable.

3) Brazil, Colombia and Venezuela, which have large mining industries but where the reform process has either not begun or is only in its early stages.

4) The other, smaller countries of the region, most of which are also in the early stages of the reform process.

B-1 THE REFORMED COUNTRY - CHILE

Chile is the number one producer of copper in the world and is an increasingly large producer of gold and other minerals. Total mineral exports in 1994 were valued at $5,300 million, which represented about 40% of total exports. Copper accounted for $4,315 million equivalent to approximately 80% of mineral exports. Mining also contributes between 15% and 35% of government revenues. Codelco, the state copper company formed by the nationalization of the major mines in 1970 still produces more than half the country's copper, although the new private mines are quickly catching up. There are moves to restructure and decentralize Codelco but as yet no intention to privatize the company.

Chile has some of the largest mines in the world and a large small mines sector but few mines of intermediate size. The local and medium mining sector has historically been less important than in Mexico and Peru but is growing fast as entrepreneurs, mainly from the construction industry, are attracted to mining.

Chile began to liberalize its economy in all respects in the mid-1970s. The mining investment and legal framework dates back to the late 1970s and early 1980s and is now fully regulated and operational. The Public Mining Institutions (PMIs) effectively

administer the sector. Work on the protection of the environment is much more recent; the law was enacted in 1994 and the institutional structure is being implemented.

B-2 THE REFORMING COUNTRIES - ARGENTINA, BOLIVIA, ECUADOR, MEXICO AND PERU

All these countries still need further work to greater or lesser degrees to ensure that the reform processes, already initiated, are completed. Peru is the furthest advanced.

B.2.1 ARGENTINA

Mining of metallic and industrial minerals in Argentina accounts for less than 0.1% of GDP, or about $150 million in 1994. If construction materials are included, total production value increases to about $450 million. Metallic mining is not yet significant; there is only one medium sized mine and several small scale operations producing zinc, lead and silver. However, exploration investment has boomed since 1993. Some 60 international companies have become involved in Argentina and as a result two to five large scale operations could start in 1996-1998. Although a few interesting properties continue to be held by some provinces, all production is now in the hands of the private sector.

The Argentine regulatory framework is based on the 1886 Mining Code which has been amended several times. The most recent amendment in 1995 included a new environmental chapter in line with present international practices. Work has begun on the simplification of the legislation through the preparation of a new Law, based on the recent amendments, which will at the same time standardize the regulations between provinces.

A mining investment law enacted in 1993 removed impediments to private investment in the sector. This law conforms to international best practices and has helped considerably in the stimulation of the present investments in exploration. The PMIs at the federal and provincial level are currently being reformed and modernized.

B.2.2 BOLIVIA

Bolivian mining is characterized by small scale (less than 500 t/day) underground mines. There is only one large scale operation (Battle Mountain's 88%-owned Kori-Kollo mine) and only a handful of medium sized mines treating over 1,000 t/day. The official value of Bolivian mineral production was $450 million in 1994 and accounts for about 8% of GDP. Official gold exports grew 55% in 1994 and are the largest source of export revenue, accounting for nearly one third of minerals trade. Artisanal miners produce significant amounts of gold most of which is not officially recorded. The importance of zinc and silver has also risen, while that of tin (in which there is now a considerable presence of artisanal miners) has declined.

Bolivian mining has historically been dominated by tin. The three major tin groups were nationalized in 1952 and the state mining corporation, Comibol, dominated the Bolivian mining industry until the tin crisis of 1985. A modest local private mining sector (the Medium Miners Association) grew up over this period, and with the demise of Comibol as

an active operator, this group now accounts for about half the value of production. Small miners account for about one quarter. International companies have only begun to take a serious interest in the country in the last few years.

Bolivia has excellent geological potential, exploration land is available at reasonable cost, and the legal and investment environment are competitive and largely in place. Unresolved problems include enacting the newly revised Mining Code, "capitalization" or the joint venturing or leasing of COMIBOL properties (not transferable to the private sector because of Constitutional restrictions), completing the restructuring and rationalization of the mining institutions, developing a mineral resource database, and addressing environmental matters.

While Bolivia has advanced considerably in the modernization of its PMIs, additional work is required before they can be considered self sufficient. The Bolivian fiscal regulations are modern and competitive but some of the corresponding regulatory norms are still under preparation. Furthermore, although Bolivia has enacted an umbrella Environmental Law it has not yet enacted the basic environmental norms and standards applicable to mining.

B.2.3 ECUADOR

Mining currently contributes less than 1% to GDP with production valued at about $120 million/yr. Most of this is gold produced by artisanal mining which is estimated to employ 40,000 people directly and support about 400,000. About 20 international companies are active in the country and in the period 1991-95, 540 exploration and exploitation licenses covering 625,000 ha. were granted. Exploration expenditures have been running at about $15 million/yr. and may reach $30 million in 1996. The prospects of mining raising its contribution to GDP significantly are great.

The mining law of 1991 and investment conditions are considered adequate and competitive although there are problems relating to conflicting environmental norms, the inexperience of the PMIs in the administration of mineral rights and in the regulation of artisanal miners.

B.2.4 MEXICO

Mexico has a wide variety of operations both in size and type. There are four main mining groups: large, medium and small local producers, and the newly arrived foreign companies. The presence of artisanal mining is minimal. The five large locally owned producers are Industrias Peñoles, IMMSA, Empresas Frisco, Grupo Acerero del Norte (GAN) and Luismin. The state companies were sold to the large local groups (mostly IMMSA and GAN) in the period 1988-1993. At this stage foreign companies, most of which began to arrive in 1993, are largely involved in exploration.

The output of the Mexican mining industry is largely concentrated in the five large local producers who account for over 80% of the total value of mining production. In terms of commodities, Mexican mining is highly diversified with a moderate degree of concentration. Seven of the over fifty commodities produced accounted for over 85% of the US$2,800 million of mineral production reported in 1994. Production values for each

of these seven commodities - copper, zinc, coal, silver, iron ore, gold, and lead - exceeded US$100 million in 1994.

Mining is one of the few sectors of the Mexican economy that have grown substantially during the past decade despite the country's severe economic problems. Over the past 15 years mining output has risen at an annual average rate of 3.5%. The foreign exchange earnings of the sector, amounting to about US$1,800 per annum, are exceeded only by those derived from oil and tourism. Yet the US$2,800 million mineral production value represents only about 0.8% of GDP.

The Mexican Mining Law of 1992 opened the sector to foreign investment and provided the legal base for the modernization of the PMIs (although with some caveats). The interest that the law generated among foreign investors contributed to the five-fold increase in exploration investment in Mexico, from about US$30 million in 1989 to about US$150 million in 1995. The government has delegated to an Environmental Ministry the responsibility for the protection of the environment but very little has been done at the sector level to establish a mining environmental office. The preparation of environmental norms applicable to mining is still in its initial phase.

B.2.5 PERU

Peruvian mineral production in 1994 was US$2120 million. Its composition is highly diversified; production values for three commodities - copper, gold, and zinc - exceeded US$400 million. Three others - silver, lead, and iron ore - had production values exceeding US$100 million. The mining sector and its related industries account for about 5% of GDP. Over the past three years the sector has generated between $1,500 and $1,800 million/yr. in export income, which is about 45% of the country's total merchandise exports. Over one quarter million people depend on formal mining for their livelihood and it is estimated that this could double with planned additions to mining capacity over the next eight years. Total direct investment in mining is estimated at $1.2 billion in 1995.

About two thirds of Peruvian mineral production comes from large enterprises. This portion of the production is in turn split two thirds/one third between the private sector and the soon to be privatized, sole remaining state entity, Centromin. About a quarter of mineral production comes from privately owned medium mining enterprises and most of the balance, largely gold production, from informal mining.

There is a huge variety of operations both in size and type ranging from large open pits to small and medium sized polymetallic underground and surface mines. Peru followed Chile in nationalizing the major foreign corporations in the early 1970s but has reversed this policy. Hierro-Perú and Minero-Perú have been privatized and Centromin is in the tender process. Most of the private companies are locally and usually family controlled although several are quoted on the stock exchange.

The Peruvian General Mining Law of 1992 provided a sound basis for the modernization of the sector. By establishing a level playing field between public and private, and between foreign and national enterprises, the law redefined the role of the state in mining.

The law was well received by the international mining companies, resulting in the spectacular growth in exploration investment in Peru from about US$10 million in 1989 to about US$200 million in 1995. The law also provided the legal base for the modernization of the PMIs and simplified the administration of mineral rights. Since the law was enacted, the modernization of the PMIs has advanced considerably but continued efforts are still necessary. Important problems remain unresolved and environmental protection work requires full implementation of a national coordinating environmental authority.

B-3 THE MAJOR COUNTRIES STILL TO BE REFORMED - BRAZIL, COLOMBIA AND VENEZUELA

B.3.1 BRAZIL

The value of mineral production in Brazil is estimated at $6,000 million in 1994, or slightly over 1% of GDP. The sector is dominated by one parastatal, Companhia do Vale do Rio Doce (CVRD) which is majority government owned but currently in the early stages of privatization. CVRD accounts for about 20% of total sector output, is the world's largest producer of iron ore and an important producer of bauxite, manganese and gold. Outside CVRD the degree of concentration is modest. The next four companies, all of them private, are responsible for about 15% of sector output. International companies participate in some of the "medium sized" enterprises where they operate as managers while holding up to 49% of the equity; Brazilian partners share the balance of the equity. Artisanal gold mining, referred to as garimpo gold mining, directly involves some 300,000 miners and indirectly about one million people. It is causing severe social problems and environmental degradation.

Brazil's mineral potential is very high but production has grown only slowly since the enactment of the 1988 Constitution. Far more serious however, is the sharp fall in exploration and mining investment between 1988 and 1994 to about one third of the level of the early 1980s. This implies that even current production levels could become unsustainable. The recent amendment to the Brazilian constitution lifting the restrictions on foreign investment in mining is an important step towards addressing concerns of investors, but other important reasons for the low and falling investment have still to be addressed. These are an inadequate regulatory framework, weak sector institutions and complex, non-competitive mineral taxation (see Section III F-3). Brazilian mining could benefit substantially from:

- A thorough review of the Mining Code of 1967 in order to modernize the administration of mineral rights, to withdraw the existing bias in favor of "garimpo" mining, and to release rights not being explored or exploited.

- Modernization of the PMIs.

- Revision of mineral taxation as that of Brazil is the most complex of the major mining countries and its effective tax rates are among the highest.

B.3.2 COLOMBIA

The value of Colombia's mineral production, predominantly coal, gold, nickel and emeralds, estimated at about $1,500 million/yr. account for about 3% of GDP. Colombia has about 30 large and medium scale mining companies and a large number of small scale miners. Informal and artisanal mining accounts for over 80% of gold and emeralds. In addition, there are about 1,200 small coal mining operations which produced 4.8 million t coal in 1994, close to 20% of the total coal production of the country. Most operations are privately owned but the government holds interests in coal (Carbocol), nickel (Cerro Matoso), emeralds, phosphates and salt.

Mining production has been stable for the past few years but mining in Colombia has good potential to increase its contribution to the national economy. Despite its geological advantages, it is the only major mineral producing country in the region which has not attracted significant private investment in exploration, partly because the government has not yet embraced the reforms being implemented in other countries of the LAC region. In addition to the problems of law enforcement and civil commotion, the 1987 Mining Code establishes a highly fragmented and discretionary system of access to mining rights. Mostly because of the deficiencies of the legal framework, the PMIs have not developed to the extent necessary to ensure adequate support for a private sector led mining industry.

B.3.3 VENEZUELA

Venezuela's mineral production is valued at about $800 million/yr., or about 1.5% of GDP. The country is an important producer of bauxite and iron ore with potential for increasing gold, nickel and coal production. The bulk of the mining industry is state-owned, mostly subsidiaries of the Corporación Venezolana de Guayana (CVG), although some foreign minority participation exists in the alumina, aluminum and coal operations. Foreign investors are actively exploring for gold and nickel, some with well publicized success. Local private enterprises are not significantly involved in Venezuelan mining. Artisanal mining has a relatively small share of gold production.

The existing legal and institutional framework does not provide Venezuela with an environment which will facilitate an orderly growth of its mineral sector in line with its potential. The regulations are unclear in some central aspects of the Mining Law and in subsequent Decrees and Resolutions. These affect the access of investors to mineral resources and the security of tenure of their concessions. Similarly, the existing institutional framework does not provide for adequate administration of the sector and requires major restructuring.

B-4 THE SMALLER UNREFORMED AND REFORMING COUNTRIES

Aside from Mexico and the main South American countries covered in the three previous sections, mining is important or potentially important in some Caribbean and Central American countries. However, with the possible exception of Guyana, relatively little work has been done on mineral sector reform in these countries.

B.4.1 GUYANA

The mining industry in Guyana is dominated by bauxite. Bauxite production in 1994 was 2.1 million t, roughly 2% of world production. Aside from the Omai operation, the only large scale gold mine, gold and diamonds are produced by small miners. The development of more industrial scale gold and diamond operations would greatly increase the country's mineral output. Gold production quadrupled between 1992 and 1994 and bauxite and gold account for 40% of exports and a large share of industrial employment. The value of mineral production in Guyana is about US$200 million/year, which represents over 25% of GDP.

B.4.2 JAMAICA

Like Guyana, mining is dominated by bauxite and alumina. The industry contributes approximately $700 million/year to the economy, accounts for about 22% of foreign exchange earnings, about 20% of GDP and approximately 75% of merchandise exports. It also contributes significantly to direct and indirect formal employment. Bauxite and alumina will continue to play a pivotal role in the Jamaican economy but there is potential for the discovery of deposits of copper and gold.

B.4.3 SURINAME

Over 25% of Suriname's GDP comes from its bauxite, alumina and aluminum industry. Exports of alumina and aluminum generate about $300 million/yr. and represent over 80% of foreign exchange earnings. At current rates of production, bauxite mining will continue to be a major industrial activity for over 150 years but the country has good potential for diversifying into gold mining. At least six international companies are currently exploring for gold in the country's greenstone belts.

In addition to the countries mentioned above, Costa Rica, the Dominican Republic, Nicaragua and Panama all have the potential to expand their mining sectors. In most of them, significant reforms of the relevant legislation and substantial modernization of the PMIs will be required.

CHAPTER II: LEGAL AND FISCAL ASPECTS OF MINING REGULATION IN LATIN AMERICA

A. INTRODUCTION

This chapter discusses the legal and fiscal framework that needs to be in place to support a sustainable and environmentally satisfactory, private sector led mining industry. Against this background it assesses the status of the reforms affecting the mining sector in LAC with respect to legal and fiscal matters and makes recommendations for priority actions.

Firstly, in Section B, the basic legal issues involved and the main characteristics of successful legal frameworks are discussed. These include the role of the constitution as it affects the type of legal regime; security of title to mineral rights; limitations on discretion in the implementation of mining law so as to minimize the possibility of corruption; limitations on the role of government; Stabilization agreements; transparency and accountability; and neutral adjudication.

Secondly, in Section C, the four key issues which determine access to mineral rights are reviewed. These issues are: minimizing state land holdings; modernizing the cadastral system; eliminating discrimination in eligibility criteria; and granting inclusive mineral rights i.e. rights to all minerals found on a concession, not just specific minerals.

Thirdly, in Section D, other key features of mineral rights and their related obligations are covered. These include the right of a concession holder to transfer title to a third party or to use it as security and the norms for standardized sizes, shapes and terms for concessions. Also covered are the obligations of the concession holder regarding surface rentals or work/investment requirements, reporting and other matters.

Fourthly, in Section E, the other key economic and fiscal measures which may have either stimulated or constrained mining investment in the region are identified. The two most important economic policies are freedom to sell mineral output at world market prices, the elimination of exchange controls and an equitable and stable tax regime.

The final section, Section F, assesses the reform process as it is today for the four groups of countries described in Chapter 1 and makes recommendations for the future. The chapter concludes that the priority legal requirements can be summarized as shown in Table II.1 below.

Table II.1: Priority Requirements

Basic Legal Framework

1. Constitutional clarity as to
   - ownership
   - authority
   - requirement of legislation
   - eligibility
   - guarantees of property rights and non-discrimination
   - security of title
2. Legislative foundation with clear allocation of jurisdiction
3. Lack of discretion in criteria and their application
4. Limitation of, or reduction in, the State's direct role in production and exploration
5. stabilization of long-term foreign exchange and fiscal regimes
6. Independence, transparency and accountability of the mineral rights regime
7. Effective, neutral dispute resolution system

Access to Mineral Rights

8. Minimization of the mineral rights granted to state-owned enterprises
9. Modernization of the mining cadaster
10. Elimination of discriminatory eligibility criteria

Nature of Rights

11. Transferability and mortgageability of rights

Economic and Fiscal Matters

12. Assurance of marketing freedom
13. Elimination of exchange controls
14. Equitable taxation based primarily on income

B. BASIC LEGAL FRAMEWORK

B-1 CONSTITUTIONAL ISSUES

Any reform of a country's legal framework to support private investment in mining must commence with consideration of the national constitution. Because the constitution is considerably more difficult to change than legislation or executive decrees, constitutional provisions can provide the strongest security for investors or the most difficult obstacles to modernization of a country's mining sector.

LAC constitutions typically establish the State's inalienable dominion over mineral resources and separate mineral rights from surface rights. They also typically:

1. Establish the sovereignty and the exclusive authority of the government to set and implement the rules governing mineral rights;

2. Require that terms and conditions under which mineral rights i.e. the exclusive right to extract minerals may be acquired and held, be established by legislation; and
3. Establish whether any class of persons is ineligible to acquire and hold mineral rights.

LAC constitutions differ significantly in the degree to which they guarantee private property rights and non-discriminatory treatment under the law, or prohibit private parties or foreigners from acquiring rights in certain assets or areas. These constitutional factors are fundamental determinants of the attractiveness of a country's legal framework for investment.

The most successful LAC mining reforms have included constitutional reform as their cornerstone. For example, the Chilean reform was founded on explicit protection of private property rights, including mineral rights, in the 1980 Constitution. Similarly, the 1993 Peruvian constitution elevates the status of property rights in mining concessions and strengthens their protection against unjust expropriation. Moreover, both countries' constitutions require the rules governing mineral rights to be established by an "organic law", which can only be amended or repealed by a super majority vote of the legislature.

In contrast, provisions in the Bolivian constitution which prohibit any transfer of nationalized mining properties to private parties have complicated and delayed efforts to privatize the state owned and operated COMIBOL mines. Provisions in the Brazilian and Mexican constitutions, which exclude foreign individuals and foreign-controlled companies from acquiring mining concessions, have impeded foreign investment in both countries' mining sectors. This problem has been corrected in Brazil by a 1995 Constitutional Amendment and has been substantially remedied in Mexico by statute, even though Mexico's restrictive constitutional provision remains in effect.

Table II.2: Key Constitutional Provisions

Protections for Private Investment
• A clear statement of sovereignty and ownership of mineral resources, and of authority to grant mineral rights to private parties • Guarantee of non-discriminatory treatment of private parties and foreign interests under the law • Guarantee against expropriation of private property except for public necessity as determined by legislation, and upon prompt payment of the fair value of the property in convertible currency, all subject to due process of law.
Obstacles to Private Investment
• Absolute prohibitions against the transfer of State-owned properties to private or foreign parties • Absolute prohibitions against the acquisition of any mineral or other property rights by any and all foreign parties in border areas • Unrestricted authority of the Executive Power to prohibit access to sites by creating reserves • Discrimination against private or foreign parties in eligibility requirements for mineral rights. • Antiquated or restrictive definitions of mining or minerals which can frustrate development by modern mining techniques.

B-2 MINING LAW REGIMES

There are three types of mining law regimes in LAC countries: administrative, adjudicative and contractual. Whether a country has an administrative or an adjudicative regime

reflects the country's legal tradition and orientation. Mineral rights are established and extinguished by administrative proceedings of the ministry in charge of mining in the majority of LAC countries but by judges through adjudicative proceedings in Bolivia[2] and Chile. However, in all the major mining countries the terms and conditions for mineral rights are fixed in the mining law. In Argentina, where most mineral rights are subject to provincial rather than federal procedures, some provinces have administrative and others adjudicative regimes.

Contractual regimes prevail in Colombia, Honduras and Venezuela. In these countries the mining laws establish administrative regimes for the grant and regulation of mineral rights but the countries lack the mining tradition of the major mining countries and rely primarily on contracts to define mineral rights and obligations. Their contractual regimes may, however, evolve into pure administrative regimes. Bolivia also intends to rely on contractual agreements to develop the nationalized mining properties of COMIBOL, which cannot be transferred because of the constitutional prohibition mentioned above.

B.2.1 ADMINISTRATIVE REGIMES

For administrative regimes to be perceived as fair by investors, it is important that the institutions responsible for granting and extinguishing mineral rights have no authority to conduct mining operations themselves. They must be completely independent from any state mining institutions, their procedures must be transparent and their actions accountable.

Administrative regimes are more responsive to policy changes, require fewer legal professionals than adjudicative regimes, and are consequently easier to reform than adjudicative regimes when the political will is present.

Key features of the successful reform of administrative regimes, as exemplified by those which have taken place in Mexico and Peru, have been:

1. Strict limitation of the Government's right to establish or hold mining reserves.

2. Simplification and clarification of non-discretionary criteria for the award, maintenance and extinction of mineral rights.

3. Requirements of notice, an opportunity to present evidence and remedy defects, and the delivery of administrative decisions in writing.

4. The right to at least one appeal against adverse decisions through an administrative procedure, and the right to one appeal to a court of law.

B.2.2 ADJUDICATIVE REGIMES

Adjudicative regimes have, in theory, the attractive quality of a judicial officer authorized to grant and extinguish mineral rights completely independently of any state mining

[2] However, the new Bolivian Mining Code, presently in the last stages of approval, would institute an administrative regime.

interests. The procedures of adjudicative systems tend to be transparent and accountable but require a strong, independent judiciary which is not found in most LAC countries.

Furthermore, the adversarial and litigious character of an adjudicative system may be perceived as detrimental to providing adequate security of title. This has been a problem in Bolivia. In Chile, where the adjudicative procedures do provide adequate security of title, the process of litigating and defending mineral rights is perceived by some industry executives to be costly and time-consuming.

To function efficiently and equitably, an adjudicative regime needs:

1. A comprehensive and reliable cadastral system;

2. A corps of well-trained and disciplined judges and staff; and

3. A mining law which limits, simplifies and defines the procedural requirements for obtaining and maintaining mineral rights, and the rights of third parties to attack petitions or vested rights.

Adjudicative regimes are based on different institutions and have different staffing requirements from administrative regimes. Therefore, implanting an adjudicative regime in a country with an administrative tradition would involve a radical transformation. However, many of the requirements and procedural safeguards in the Chilean Mining Code, which is an adjudicative regime, could be adapted to provide greater transparency and accountability in an administrative system needing reform while avoiding the litigiousness of an adjudicative system.

B.2.3 CONTRACTUAL REGIMES

A contractual regime requires a clear constitutional and/or statutory statement of which official is authorized to enter into agreements binding the state. The statement must also define the official's authority and the procedural requirements for approval of the forms and terms of agreements. Countries with contractual regimes should publish standard forms of contracts which minimize and highlight the negotiable terms in order to avoid burdensome negotiations and enhance the transparency of the contract award process.

Investors are receptive to contractual regimes where they provide good security of title and fiscal and foreign exchange stability without lengthy and difficult negotiations. However, the three LAC contractual regimes mentioned do not provide these essential benefits. Only the Corporación Venezolana de Guyana (CVG) work contract in Venezuela provides some security of title, in that it covers exploration and exploitation, but it does not provide an absolute right to proceed from one phase to the other. In Colombia and Honduras, contracts are entered into after completion of the exploration phase and therefore provide no assurance of the grant of exploitation rights. Moreover, none of the three countries provides contractual guarantees of fiscal and foreign exchange stability.

Unlike administrative and adjudicative regimes which are supplemented by fiscal and foreign exchange stabilization agreements, contractual regimes utilize contracts to define

mineral rights and obligations. It is better to define those rights and obligations in the mining law and limit contractual agreements to the essential stabilization terms necessary to attract foreign investment, as is the case in Chile and Peru.

B-3 CHARACTERISTICS OF SUCCESSFUL LEGAL FRAMEWORKS

The most successful mining law regimes in LAC are grounded in modern legislation based on clear constitutional authority. The Chilean, Ecuadorian, Mexican and Peruvian reforms have such a foundation. In contrast, attempts to overcome legal or institutional weaknesses or obstacles by Presidential decrees without comprehensive new legislation have been less successful. In countries with federal systems such as Argentina, Brazil and Venezuela, it is particularly important to resolve the allocation of jurisdiction between the national, state and local governments for mining activities and related matters such as environmental protection.

A comprehensive legal framework should however contain a number of minimum guarantees that are described below.

B.3.1 SECURITY OF TITLE

Security of title is the prime requisite of any investor. The law must ensure that a mineral right, once granted, (a) cannot be suspended or revoked except on specified grounds which are clearly set out in the law and (b) provides reasonable assurances guaranteeing the continuity of operations over the life of the project. The successful LAC mining law reforms treat security of title as the top priority issue.

Peru provides perhaps the greatest security under its single concession for exploration and exploitation, which guarantees the concession holder the ability to maintain a concession indefinitely, as long as he complies with non-discretionary statutory obligations. Chile and Mexico both provide the exclusive right of the holder of an exploration concession to obtain an exploitation concession for all or part of the territory covered by the exploration concession, and to maintain the exploitation concession by compliance with limited, objective, statutory obligations.

B.3.2 LACK OF DISCRETION

The successful LAC mining law reforms have been designed to minimize corruption and processing time by eliminating discretion in the implementation of the mining law. The principal regulations have also been promulgated by Presidential decree in order to enforce accountability and discourage frequent changes. These reforms have:

1. Eliminated any requirement for a mineral right applicant to demonstrate either the existence of a commercially viable deposit, or the applicant's financial and technical ability to carry out a work program;

2. Either eliminated or standardized the work / investment / production requirements and the means of satisfying them;

3. Established procedures which require the designated authority to issue the appropriate mineral right to a qualified applicant;

4. Specified the obligations of holders of mineral rights and the means of complying with them; and

5. Limited the grounds and procedures for cancellation of mineral rights.

B.3.3 LIMITING THE ROLE OF GOVERNMENT

Mining sector reforms in countries with state-owned mining entities have also included some or all of the following measures in order to limit, reduce or eliminate the role of the government in exploration and production:

1. Elimination of preferences for state entities in the mining code (under reformed mining laws, state mining companies should be subject to the same requirements and obligations as private parties);

2. Statutory reductions in, or limitations on, the powers and authority of state-owned enterprises;

3. Statutory authorization for the disposition of state-owned enterprises or their assets by sale, lease or contract; and

4. Legislation to remove legal obstacles to the privatization prior process to attempts to privatize.

B.3.4 STABILIZATION AGREEMENTS

Stabilization agreements have played a major role in attracting new investment capital. Chile and Peru offer investors the opportunity to "lock-in" specified tax, customs and foreign exchange provisions for terms ranging from 10 to 20 years[3]. These stabilization agreements have the following features in common:

1. Standardized, non-negotiable forms and terms, to avoid the appearance of special treatment for particular investors;

2. Explicit guarantees of stabilized treatment with respect to fiscal burdens, foreign exchange controls and marketing rights for specified time periods; but no tax incentives or modification of mineral rights which might distort investment decisions.

Under stabilization agreements the investor is assured of long term fiscal and foreign exchange terms. In return, the host country obtains an enforceable commitment on the part of the investor to carry out a specified and verifiable investment program.

There are significant differences between the Chilean and Peruvian stabilization agreements (Annex 1). For example, in Chile, the foreign investor must accept a higher total effective income tax rate than under current law as the price for fiscal and foreign

[3] In Argentina, the Mining Investment Law No. 24196 of 1993 provides tax stability for 30 years, excluding the VAT.

exchange guarantees. In Peru, the stabilization term for major investments is shorter and the price is a commitment to a specified amount of investment and/or production capacity increase. Furthermore, stabilization agreements are instruments of general foreign investment policy in Chile and apply to all economic sectors, whereas in Peru they are restricted to mining.

Virtually all major foreign investments in the Chilean mining sector in the late 1980's and early 1990's were made under stabilization agreements. However, an increasing number are now being made without such agreements, presumably reflecting increased confidence in the Chilean economy and legal regime.

While Stabilization Agreements deal primarily with economic and fiscal issues investors are starting to seek stability in environmental requirements. While this stability may be desirable from the point of view of an investor, most LAC countries have not yet reached the stage in environmental management to be in a position to adequately address such requests.

B.3.5 TRANSPARENCY AND ACCOUNTABILITY

In order to provide for the transparency and accountability of administrative or judicial decision-making with respect to mining concessions, a mining law should include the following features:

1. Explicit, simplified, and detailed requirements and procedures for obtaining, maintaining and terminating mineral rights;

2. Specific time frames within which applicants and regulators are required to take certain actions or make certain decisions;

3. Effective publication of notice followed by an opportunity to be heard before any significant action affecting solicited or acquired rights is taken;

4. A requirement that all decisions affecting solicited or acquired rights be in writing; and

5. An opportunity for administrative (if appropriate) and judicial review of decisions affecting solicited or acquired rights.

B.3.6 NEUTRAL ADJUDICATION

A significant feature of the Chilean mining law is that it provides for adjudication by an independent judiciary. Countries with administrative regimes should also incorporate neutral adjudication and appeal mechanisms into their frameworks. The Peruvian mining law provides for a 3-stage appeals process from adverse decisions on applications for, or oppositions to, mining titles. Although none of the LAC mining laws or stabilization agreements provide for international arbitration, there are a number of mechanisms which may provide recourse to local or international arbitration for resolution of major disputes with the host state, such as: (a) provisions in negotiated investment agreements between foreign companies and state-owned enterprises; (b) foreign investment law provisions (e.g., Bolivia and Venezuela); (c) bilateral investment treaties (e.g., between the US and

Argentina and Ecuador, respectively); (d) agreements between host country governments and international investment guarantee agencies such as MIGA and OPIC (ratified by all of the significant mining countries except Mexico); and (e) the International Convention on the Settlement of Investment Disputes (ICSID) (e.g., Chile and Peru).

The trend in LAC has been toward increasing acceptance of international arbitration, as evidenced by the rapid growth in ICSID ratification across the region. Even Mexico, which has historically resisted international arbitration, has recently accepted the enforcement of international arbitration clauses against Mexican companies and has agreed in the North American Free Trade Agreement (NAFTA) to international arbitration of investment disputes with Canadian and US investors. Expanding access to arbitration under ICSID or the other widely accepted rules[4] is an important element of a successful strategy for attracting major foreign investment into the mining sectors of most LAC countries.

C. ACCESS TO MINERAL RIGHTS

C-1 MINIMIZING THE STATE'S LAND HOLDINGS

Minimizing mineral rights reserved for exploration and development by the state is a priority issue in mining law reform. A common problem in unreformed mineral law regimes is that huge areas have been reserved in perpetuity by government fiat for potential future exploitation by state entities. These areas are therefore unavailable to private investors even though most are not under active exploration or development. Mining law reforms do away with unnecessary reserves and limit the ability of the government to create reserves in the future. To do so, the mining law should:

1. Specify the purposes, conditions and terms for which the government is authorized to establish areas where the mineral rights are reserved to the State e.g., environmental protection, archaeological preservation, national security, public works, safety, specific studies, etc.

2. Require the Executive Power to follow a prescribed consultative procedure for establishing reserves.

3. Impose term limits on the duration of reserves, or at least a procedure for periodically reviewing the need for such reserves.

4. Require the government to implement a program of activities to achieve the purposes of the reserves.

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[4] These include the appropriate arbitration rules of the International Court of Arbitration of the International Chamber of Commerce (ICC), the United Nations Commission on International Trade Law (UNCITRAL), the American Arbitration Association (AAA), and the Inter-American Commercial Arbitration Commission (IACAC).

5. Authorize the chief administrative authority of the mining sector to declare the termination of reserves automatically when the statutory procedures have not been satisfied, subject to an appropriate transition time frame.

Such measures were a central feature of the Mexican and Peruvian mining law reforms and resulted in the liberation of over 90% of the previously reserved territories.

C-2 MODERNIZATION OF THE MINING CADASTER

A comprehensive, reliable mining cadaster is a pre-requisite for a private investment-driven mining sector and therefore modernization of the cadaster is a priority issue in mining law reform. Chile, Mexico and Peru have recently reformed and computerized their cadastral records. In all three countries, the mining law was amended to facilitate concession boundary identification and to avoid overlapping concessions.

Aside from establishing standard criteria which will minimize conflicts and disputes, the key legal issue in modernizing a cadastral system is the integration of existing concession rights.

C-3 NON-DISCRIMINATORY ELIGIBILITY CRITERIA

Eliminating discriminatory eligibility criteria is another priority. Legal provisions which prohibit foreigners from owning mineral titles, directly or indirectly, prevent capital formation in the local mining industry. Statutory restrictions on foreign participation in mining in Mexico, and a hostile political environment in Bolivia and Peru, prevented the financing of substantial new exploration in those countries for 30 years. Constitutional restrictions on foreign ownership of mineral rights have also severely constrained the growth of private mining in Brazil over the last seven years[5].

In contrast, over the last few years, billions of dollars in new capital have flowed into the mining industry in Chile, which does not discriminate against foreign ownership. Requiring foreign corporate investors to own and operate their mining properties through a locally registered company and be represented by a resident national is not considered a serious impediment to foreign investment.

C-4 INCLUSIVENESS OF MINING RIGHTS

Mining laws should distinguish between concessionable minerals i.e., all metallic minerals, gemstones and other high-value minerals requiring elaborate extraction techniques and construction minerals, which usually require significantly less capital to locate, extract and process.

Rights to concessionable minerals should entitle the holder to explore for, or exploit, all concessionable minerals within a concession as there is no efficient way of administering multiple rights for distinct minerals within a single area. Rights to exploit construction materials are usually provided for under a distinct section of the mining law.

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[5] The Brazilian Congress approved in May 1995 an amendment to the 1988 Constitution opening the door to majority foreign ownership in mining enterprises.

D. MINERAL RIGHTS AND RELATED OBLIGATIONS

D-1 TRANSFERABILITY AND MORTGAGEABILITY

The trend among modern mining laws in LAC is to recognize an absolute right of the holder to transfer both exploration and exploitation concessions to any third party eligible to hold them. This flexibility improves liquidity for investors, enables them to obtain financing, and is a necessary condition for the development of a market in mineral properties, as has occurred in Chile. In Bolivia, Chile and Peru, mining concessions are real property rights which are mortgageable. In Mexico, mining concessions are not real property rights but are pledgeable as security, and the pledges are recordable in the Registry of Mining. Reformed mining codes permit the subdivision and sublease of concession areas without the need for additional authorization.

D-2 SIZE, SHAPE AND TERMS OF CONCESSIONS

All successfully reformed LAC mining codes specify the size, shape and term limitations of exploration and exploitation concessions, and do not leave such elements open to negotiation or discretion. Their laws require that concessions conform to a regular geometric shape or consist of contiguous standard-sized units, have borders which run only north-south and east-west, and be identified by their UTM (Mercator Universal Transverse Projection) coordinates. Table II.3 sets out the limitations in the mining laws of Bolivia, Chile, Ecuador, Mexico and Peru, all of which are recognized as reasonable by the international mining community.

Table II.3: Concession Size, Shape and Limitations

EXPLORATION					
		SIZE			
Country	Shape	Maximum Concession	Maximum Countrywide Holdings	Initial Term	Renewals
Bolivia	Polygon of contiguous hectares	20,000 ha.	Unlimited	4 years	1 x 2 years
Chile	Parallelogram, N-S	5,000 ha.	Unlimited	2 years	1 x 2 years on half the area
Ecuador	Polygon of contiguous hectares	5,000 ha.	Unlimited	2 years	2 x 2 years on entire area
Mexico	Polygon N-S and E-W	Unlimited	Unlimited	6 years	None
Peru*	Polygon of contiguous 100 ha. units	1,000 ha. (10,000 ha. in seabed)	Unlimited	-	-

EXPLOITATION					
		SIZE			
Country	Shape	Maximum Concession	Maximum Countrywide Holdings	Initial Term	Renewals
Bolivia	Polygon of contiguous hectares	20,000 ha.	20,000 ha.	Indefinite	Not applicable
Chile	Parallelogram, N-S	10 ha.	Unlimited	Indefinite	Not applicable
Ecuador	Polygon of contiguous hectares	3,000 ha.	Unlimited	20 years	1 x 20 years
Mexico	Polygon N-S and E-W	Unlimited	Unlimited	50 years	1 x 50 years
Peru*	-	-	-	Indefinite	Not applicable
* Single concession for exploration and exploitation					

D-3 OBLIGATIONS OF THE CONCESSION HOLDER

D.3.1 SURFACE RENTALS VS. WORK / INVESTMENT REQUIREMENTS

Most LAC mining laws require the holder of an exploration or exploitation concession to make regular periodic payments of a per hectare fee in order to retain the concession. These "surface rentals", as they are termed[6], serve the following purposes: to pay for administration; provide revenue for local and provincial or state governments; and to

[6] It should be noted that these payments are to maintain the right to extract minerals over a designated area. They do not usually convey any rights to use of the land surface for exploration or mine development. Access to, and use of, the surface is normally granted under a separate agreement with the landowner.

discourage unproductive holdings. The best practice is characterized by the following features:

1. Reasonableness of the Burden. Surface rentals should be low during exploration (e.g. typically about $1.00 per hectare) when they constitute a significant share of total cost for the investor; and higher during exploitation in those countries with a two-concession system), when these rentals constitute a relatively insignificant burden (e.g. up to $4.50 per hectare in Chile).

2. Rate Stability. Rates for surface rentals should be set in the mining code or the mining regulations and indexed to inflation.

3. Relationship to Holdings. The payment obligation should commence only upon, or immediately prior to, the grant of the concession, and should apply for each year only as to the number of hectares held at the beginning of the period.

A second option to encourage exploration and subsequent mine development is the use of annual minimum work or investment requirements. However, monitoring and enforcement of such requirements necessitates administrative staff and resources while the requirements do not generate revenues to pay for those costs. Moreover, work and/or investment requirements are poor substitutes for the market in encouraging relinquishment of unproductive holdings. All too often, poorly defined work requirements administered by underpaid staff lead to bureaucratic bottlenecks and corruption, or speculative challenges to concession rights by third parties. An annual per hectare fee to retain a concession is a sounder approach to maintenance obligations.

Box II.1: Substituting Work Requirements: The Peruvian Approach

An example of a flexible approach to enforcement of constitutionally mandated work requirements has been taken in Peru, where every metallic mining concession is required to produce not less than $100/ha/yr from the eighth year on. However, concessions which do not meet the requirement are allowed to be maintained by payment of a $2.00/ha penalty which increases annually to a maximum of $10.00/ha. in the 14th year. Thus, a non-producing concession can be maintained simply by payment of the applicable annual fee (including penalty) per hectare. Under Peru's single concession system, the magnitude of the penalty is a strong disincentive to holding unproductive properties and the problems associated with work requirement programs are avoided.

D.3.2 REPORTS

Reporting requirements specified in the mining law should be justified and tailored to actual needs. In determining reporting requirements, the revisers of a country's mining law should consider the following questions:

1. To what use will the information be put?

2. How will the reliability of the information be assured?

3. How will the reporting requirement be enforced?

4. What costs will be involved in collecting, reviewing, cataloging and utilizing the information?

5. How will the confidentiality of exploration results be preserved?

D.3.3 HEALTH AND SAFETY

It is important not to confuse mine health and safety regulation with the rules for establishing, maintaining and extinguishing mineral rights. Compliance with mine health and safety standards is not a condition for the maintenance of mineral rights under the mining laws of the major LAC mining countries. Violations of health and safety standards are punishable by fines or imprisonment and, in some cases, suspension of operating rights, but not by cancellation of mining rights.

D.3.4 ENVIRONMENTAL PROTECTION

Most LAC countries regulate environmental protection in the mining industry outside of the mining code and the mining ministry. Virtually all the countries have environmental protection legislation but in most cases these laws are framework laws requiring the development of sectoral standards and compliance procedures. Environmental protection regulation is treated extensively in Chapter 5.

D.3.5 PROVISION FOR MINE CLOSURE

Host country governments have an interest in assuring that exhausted mines will be closed in an environmentally sound manner; that the mine infrastructure will become part of the national or regional infrastructure, or else decommissioned as appropriate; and that mining communities will be able to sustain themselves or relocate. The mining regulations of the LAC countries reviewed for this study do not appear to contemplate a role for the mining ministries in assuring that a proper coordinating mechanism for this planning and transition process exists and functions effectively; nor how closure costs are to be borne or shared between the private and public sectors. Additional reflection and work should be devoted to this issue.

D.3.6 INFRASTRUCTURE INTEGRATION

The mining laws of the major LAC mining countries generally do not impose requirements on concession holders with respect to the construction of infrastructure and its integration with regional or local infrastructure. Yet mining companies typically construct roads, power plants, railroads and ports as part of major projects. Only Venezuela, which probably has some of the best infrastructure of any LAC country, requires concession holders and CVG work contractors to plan and implement mine infrastructure in coordination with regional and local planning authorities.

E. FISCAL AND ECONOMIC ISSUES

E-1 EXCHANGE CONTROL ELIMINATION

Another key to success has been the elimination of exchange controls. In Argentina, Bolivia, Chile, Mexico and Peru, national and foreign investors can maintain domestic and offshore accounts denominated in foreign currency, and have free access to foreign currency at market rates. Countries with exchange controls will find it necessary to either liberalize the controls or enter into bilateral investment treaties (e.g., between Ecuador and the US) or investment agreements in order to guarantee the investors' rights to utilize foreign exchange revenues for legitimate offshore costs and returns on investment capital. Even the countries currently without exchange controls have found it necessary to guarantee, by foreign investment legislation, stabilization agreements (addressed above), and/or bilateral investment treaties, the availability and terms of access to foreign exchange.

E-2 OUTPUT TAXES

In a radical departure from prior practice, Chile, Mexico and Peru have eliminated all royalties or production taxes on mineral output. This greatly enhances their attractiveness to private investors. Bolivia has also eliminated royalties for mining companies which commenced operations after April 11, 1991, requiring them instead to pay the higher of (a) a 2.5% tax on net sales or (b) an income tax of 30%.

Countries with less of a mining tradition will find it necessary to compete with the aforementioned royalty-free regimes. Countries which wish to retain royalties should set their royalty levels after considering the entire fiscal burden on mining investors in their country.

E-3 INPUT TAXES

The main taxes on mining industry inputs in LAC countries are import duties and payroll charges (e.g., contributions for social security, pensions, medical benefits, etc.). Value-added tax (VAT) and/or sales tax are considered below under "Transaction Taxes".

Import duties are generally being reduced or removed throughout Latin America. High import duties on equipment adversely affect the competitiveness of local mining without significantly improving the chances of developing an indigenous industry to produce the same machinery. Customs relief in the form of temporary import regimes can also be important to investors in minerals exploration. Although such relief is available in some LAC countries, the terms are usually very restrictive.

E-4 PROFIT AND ASSET TAXES AND CHARGES

E.4.1 INCOME AND WITHHOLDING TAX

The cumulative effective rate of taxation on corporate income and dividends paid in the LAC countries ranges from 30% in Peru and Venezuela to 34.4% in Bolivia and 35% in Chile (42% under stabilization agreements) and Mexico.

In general, the competitive LAC countries allow early recovery of exploration and start-up costs and liberal carry forward of operating losses. Mining companies are generally not averse to paying income taxes at internationally competitive rates provided the tax is creditable against their home country obligations and permits rapid recovery of capital. The reformed tax policies in Bolivia, Chile, Mexico, Peru and Venezuela satisfy these criteria.

The trend in fiscal policies away from output-based taxation of mining enterprises (i.e. royalties) toward reliance on income-based taxation at internationally competitive rates is improving the investment climate for the mining sector in the LAC region substantially, but is also making new demands on the administrative, investigative and enforcement capabilities of the fiscal authorities. For example, the treatment of transfer pricing is a key ingredient of a successful income-based taxation policy for the export-oriented mining sector. Although beyond the scope of the study, transfer pricing of mining industry inputs and outputs is an important issue which must be addressed realistically and efficiently by host country governments.

Another issue which takes on greater importance in connection with income-based taxation policies as part of a strategy to attract foreign investment is the avoidance of double taxation of foreign investor income. An important part of the solution to this issue is the negotiation of bilateral tax treaties such as the initiatives currently underway between Argentina, Brazil, Chile and Venezuela with the US. Other countries in the region may want to consider the need for creating or modifying tax treaty arrangements with key capital-exporting countries to mitigate problems of double taxation.

E.4.2 ASSET TAX

Because of the high incidence of income tax evasion and their weak institutional capability to enforce income tax obligations, several LAC countries (e.g. Mexico, Peru and Venezuela) impose an asset tax of 1% or 2% of the value of corporate assets, which is payable only to the extent that it exceeds income tax paid by the taxpayer for the year. Asset tax provisions usually allow some carry forward or carry back of income tax paid for purposes of offsetting asset tax liability. The governments in question have found the asset tax to be an effective method of ensuring a basic stream of public revenue at a rate which is consistent with business solvency and therefore is not onerous.

E.4.3 MANDATORY PROFIT SHARING

The labor legislation of many LAC countries requires all employers to pay a percentage of their profits to their workers. This constitutes an additional "hidden tax" on profits because it is not creditable against other taxes and in some cases is not even deductible in

computing taxable income. Countries which impose mandatory profit-sharing should give consideration to capping the liability or making it a tax deductible expense in order to enhance their competitiveness. Bolivia, Chile and Venezuela have capped the tax at a specified multiple of monthly wages per worker (e.g. 4 months' wages). However, in Peru, an employer must distribute a flat 8% of profits to its workers. This significantly constrains profitability.

E-5 TRANSACTION TAXES

Value-added tax (VAT), or sales tax, at rates ranging from 10% to 18%, is the main revenue-generating tax in several LAC countries. The tax is payable by mining companies on their inputs (including imports, on which it is payable in addition to customs duties); but unlike producers for the domestic market, mining companies which export their output cannot pass along to their customers the cost of VAT paid. Therefore, at least among the major mining countries, governments which impose VAT also have a mechanism for recovery of VAT paid by exporters such as mining companies.

The recovery mechanism is typically either a refund (Mexico) or issuance of a transferable tax credit (Peru). Thus, VAT ultimately impacts the cash flow rather than the net income of mining companies. However, the amounts involved are significant and it is important for countries reforming their investment frameworks to design an efficient and credible mechanism for fairly and expeditiously processing VAT refunds or credits for export-oriented mining companies.

E-6 FREEDOM OF COMMERCIAL OPERATION AND MARKETING

An essential aspect of successful mining law regimes is that companies are granted the freedom to manage their operations in the manner most appropriate on commercial criteria and without Government intervention in decisions that are essentially commercial. The Government should not, as a general rule, seek a participating share in new mine developments and seek no role in Operating Committees or project management. It should also grant freedom to sell mineral output at unregulated prices in world markets. The mining laws of Bolivia, Chile, Ecuador, Mexico and Peru permit this but other countries, for example Nicaragua and Venezuela, require all sales of gold bullion to be made to the country's central bank. Although the central bank pays world market prices for such gold, and the country benefits by enhancing the role and ability of its central bank as a participant in international gold markets, the downside is that the monopoly prevents companies from developing customer relationships. These are important to access financing through creative techniques such as, for example, "gold loans". Adherence to the principle of marketing freedom is essential to attract long term investment in mining

E-7 LABOR COST COMPETITIVENESS

The mandatory profit sharing requirement referred to in E.4.3 above, is just one of several obstacles to cost competitiveness which were built into the labor laws of many LAC countries during their years of statist and protectionist economic and social policies. Others include restrictions on hiring, firing and merit-based promotions, burdensome severance pay obligations, and nationality quotas. Adaptation of such labor law requirements to the competitive reality of the global economy is needed across the region

in order to achieve sustainable development of the mining sector. In Chile and Peru, labor law reform has played an important role in the successes achieved in their mining sectors.

F. THE STATUS OF THE REFORM PROCESS

F-1 THE REFORMED COUNTRY: CHILE

Chile established its current legal framework for mining during the early 1980s. Private property rights in mineral concessions, and guarantees of those property rights, were strengthened in the Constitution of 1980. The Organic Constitutional Law on Mineral Concessions of 1982 established the fundamental principles underlying Chile's mining law regime and an entirely new Mining Code was enacted in 1983, followed by new implementing regulations. Also during this period, Chile initiated action to strengthen its national geological service and to modernize and clean up its cadastral system.

A radical, structural macroeconomic reform program implemented around the same time began to demonstrate dramatic positive results in Chile by the late 1980's. Although privatization of state-owned enterprises was a centerpiece of the reform program, it did not include the state-owned copper mining company, Codelco. Other measures which fostered new private investment in Chile's mining sector were the stabilization agreements available under the Foreign Investment Law of 1974 (D.L. 600) and the debt-equity swap program in the mid-to-late 1980's.

As of the mid-1990's, a mature secondary market for mining properties has developed in Chile. Market prices for attractive mining properties have risen dramatically and are currently the highest in Latin America. This market is making a significant contribution to local capital formation and generating significant taxable capital gains. The key features of the Chilean legal framework which have enabled this development have been: the reliability of the mining cadaster; the security of title and unrestricted transferability of rights under the Mining Code; and the constitutional guarantees of mining property rights.

Despite Chile's success, other countries in the region were reluctant to follow its example. Prior to 1990, many failed to see how the principles underlying the unique Chilean adjudicative mining law regime could be applied in countries which lacked the independent judiciary and mining law tradition of Chile.

F-2 THE REFORMING COUNTRIES: ARGENTINA, BOLIVIA, ECUADOR, MEXICO AND PERU

Among the reforming countries, the process of reform in Peru has most closely resembled that of Chile. A radical change in political orientation away from statist economic policies and toward free market economics together with strong leadership ushered in structural macroeconomic change and related legal reforms beginning in 1991 under the first Fujimori government. Like Chile, Peru has a rich mining history and tradition, but its tradition is one of administrative rather than adjudicative determination of mining rights. In 1991 Peru passed numerous amendments to its existing mining law of 1981. In 1992, the new legal framework for mining was promulgated as the General Mining Law. Like

Chile, Peru gave stronger recognition and protection to private property rights in its new constitution but the constitution was enacted in 1993 after the amendment to the mining law. Also like Chile, Peru offers investors stabilization agreements. Unlike Chile, however, Peru has been carrying out an aggressive program of privatizing nearly all state-owned mining enterprises and has made environmental compliance an integral component of its new legal regime for mining. In 1992-1993 Peru made available to the private sector enormous areas of mineral rights which had been reserved for future exploration and exploitation by the state. Peru is presently in the process of modernizing its cadastral system and the institutions which administer the mining law.

Bolivia, another reforming country with a mining tradition but with an adjudicative mining law regime, also instituted broad macroeconomic reform policies in 1986 and enacted some clarifying amendments to its mining code in 1991. However, Bolivia's early reform efforts failed to address the following key problems: the need to radically reduce the size and role of the state mining company, COMIBOL; constitutional and statutory obstacles to privatization of mines nationalized in 1952; the lack of a mining cadaster; and inadequate security of title under the Mining Code. As of mid 1996, the Bolivian government is well advanced in the establishment of a modern mining cadaster and is finalizing the preparation of a new mining code which addresses the above issues and would convert the Bolivian adjudicative mining law regime into an administrative regime.

Mexico also adopted broad macroeconomic policies to promote private investment in the late 1980's. After an unsuccessful initial attempt to address deficiencies in its mining law by regulation, Mexico enacted a new mining law in 1992 followed by an implementing regulation in 1993. Also in 1993 an amendment to the foreign investment law changed the interpretation of a constitutional restriction on foreign ownership of mining concessions so as to permit 100% foreign ownership of new mining companies.

In the early 1990's, Mexico released substantial areas previously reserved for exploration and exploitation by the state, restructured and streamlined its institutions administering the mining law and modernized its cadastral system. It also concluded the NAFTA with the US and Canada, thereby providing fundamental assurances to investors from those two capital-exporting countries. Questions remain with respect to the vestiges of institutionalized discrimination against foreign investors and in favor of the state-owned Natural Resources Council in the Mexican constitution and mining law; the problematic definition of mining activities in the constitution; the power of organized labor and protective labor legislation; and the sustainability of the improved quality of administration of the sector by the PMIs, as discussed in Section III.B.

In 1991 Ecuador enacted a new mining law which corrected problems in the administration of mineral rights and in the institutional framework. Subsequent reforms in foreign investment policy, including a 1993 bilateral investment treaty with the US, have helped to stimulate investor interest in Ecuador's mining sector. However, the lack of a mining tradition combined with protective labor legislation limit both the supply of skilled mining labor and the administrative capability of the PMIs in the country.

Although Argentina has enjoyed a general boom in foreign investment during the mid-1990's, the limited federal authority over mineral rights and related fiscal measures, as well as the lack of mining tradition have constrained the development of a consistent legal framework for mining investment. However, Argentina adopted a new mining investment law in 1993 to provide long-term fiscal stability for investors. The federal government is in the process of preparing a new federal mining law for the purposes of clarifying and standardizing cadastral, environmental and other regulations among the provinces. The reduction of conflict between the federal and provincial governments over land tenure and taxation issues must be a key objective of this process.

F-3 THE MAJOR COUNTRIES STILL TO BE REFORMED: BRAZIL, COLOMBIA AND VENEZUELA

In contrast to Chile and Peru, Brazil adopted a new constitution in 1988 which defined private mineral rights very narrowly and allowed only Brazilian companies controlled by individuals domiciled and residing in Brazil to hold them. The local control requirement resulted in a major fall-off in foreign investment in Brazilian mining until it was eliminated by a 1995 amendment to the constitution. A corresponding amendment to the Mining Code is still needed. Additional aspects of Brazil's 1967 Mining Code which should be considered for revision include: (a) the restrictive nature and scope of exploration and mineral rights; (b) the lack of modern cadastral requirements; (c) the qualitative selection of applicants for exploration authorizations; (d) vague work requirements; and (e) the restrictions on transfers of exploration and mineral rights. Two proposed amendments to the 1967 Mining Code have been pending before the Brazilian Congress since 1993, but do not address all of these aspects of the Code.

In 1995, the Federal Government of Brazil began the process of privatizing its controlling interest in CVRD. The success of this effort could be compromised somewhat by the failure to modernize the Mining Code prior to the privatization, although neither the Code nor the 1988 Federal Constitution provides for any preferential treatment of CVRD.

In recent years, Brazil's fiscal regime has been more onerous and complex than in other LAC countries. Mining companies in Brazil, unlike those in the reformed countries of the region, must pay royalties to the Government and to landowners. As of early 1996, Brazil has reduced its income tax and social contribution rates and eliminated its withholding tax on corporate dividends in order to improve its competitiveness with other countries in the region. The Federal Government is also considering proposals by the Ministry of Mines and energy to exempt mineral exports from VAT, to provide mineral exporters with a credit mechanism for recovery of VAT paid on inputs, and to eliminate royalty obligations to landowners. Stabilization agreements are not currently available in Brazil, but merit consideration as a useful tool for encouraging long-term investment, particularly in light of the exchange controls which apply there.

While Colombia has the advantages of healthy macroeconomics; good infrastructure; a relatively strong institutional regulatory capability; and a well-developed legal system and tradition the reforms to the Code of Mines which were undertaken in 1988 did not provide an adequate base is to stimulate private sector investment in the sector. The new Code favors small miners and enables medium and large scale mining enterprises to obtain

mineral rights only in the form of contracts. These contracts are more restrictive and of a lesser legal status than the rights obtainable under the laws of the reforming countries of the region. The Colombian Code also includes royalties which are not charged by most of the other mining countries.

Venezuela has been trying to enact new mining legislation for the better part of the last decade. Under current law and practice, new metals mineral rights in Venezuela can only be obtained in the form of contracts of work from Corporación Venezolana de Guayana ("CVG") or discretionary concessions from the Ministry of Energy and Mines, depending on the minerals and their location. Both entities have virtually unlimited discretion to set the terms for all new rights, the legal status of which is fragile. The CVG contracts have proven adequate to attract foreign investment primarily by junior companies in gold exploration in Bolívar state, but it remains doubtful whether many of the resulting projects will be able to finance mine development without greater security of title, more freedom to transfer rights, and clarification of jurisdictional authority over mining activities. The Venezuelan government's proposed new mining law currently before the Congress would not bring Venezuela into line with internationally recognized best practices.

F-4 THE SMALLER UNREFORMED AND REFORMING COUNTRIES

Of the countries in this group, Guyana is perhaps the furthest along in the reform process. It enacted a well received new mining law in 1989, and has been aggressively marketing itself to foreign investors with some success. Honduras, Jamaica, and Suriname have all made progress in upgrading the norms for investment in the mining sector. The legal and institutional frameworks of most of the Central American and Caribbean countries - with the possible exception of Costa Rica and Panama - are generally regarded as outdated and weak. Their reforms should focus on removing obstacles to direct foreign investment and clarifying and simplifying procedures for the acquisition and maintenance of mining rights.

CHAPTER III: PUBLIC MINING INSTITUTIONS: THE REFORMED FRAMEWORK

A. INTRODUCTION

A-1 GENERAL OVERVIEW

This chapter analyzes the measures necessary to establish effective and sustainable Public Mining Institutions (PMI) within the broader framework of economic and mineral sector reform in the LAC countries. It sets out programs for the reform of the institutions to meet the needs of a private-sector-led mining industry. It intends to answer the following questions: why is the reform of PMIs necessary and what role do they play? how should an effective institutional framework be organized? what are the key issues and constraints to effective institutions? what are the implications for different countries? how can institutional reform be implemented? and how can the international aid community support the reform?

The LAC countries are at very different stages in the reform process and are also diverse in their abilities to implement reforms. Many have long mining traditions and active mining sectors while in others mining plays only a small role in the national economy. Many also have a pool of able technical and managerial talent while others have notable shortages in this sphere and will need assistance to bring their PMIs up to the required standard.

Firstly, in Section A, the role of PMIs and the needs for their reform are discussed. The relative roles of government and the private sector are reviewed.

Secondly, in Section B, the structure and functions of the PMIs are analyzed. Section C then looks at the constraints on the development and reform PMIs. These include human resources, financial resources, management quality, and the influence of the degree of national mining tradition existing in any given country. Finally, Section D deals with the methods to implement the reform, the need for leadership and commitment over the long term, the need for private sector involvement and the role of technical assistance (TA) programs in the reform process.

A-2 ROLE OF THE PUBLIC MINING INSTITUTIONS IN A REFORMED ECONOMIC FRAMEWORK

The role of the government in the mineral sector needs to be seen within the overall economic and development policies of a country. After decades of state intervention with negative results, most countries in the LAC region are shaping free market economies and putting in place a reformed mineral sector framework. This will require reform of the Public Mining Institutions (PMI) for the effective administration of the reformed legal and

fiscal framework which has been or will be put in place to implement the new Government policies.

Given the high risk nature of exploration, the role of the state should be confined to the initial low cost, risk-free activities of the mining development sequence. These activities aim at gathering basic geologic information which is useful for subsequent exploration. This leaves the high risk, high-cost exploratory activities to the private sector. The distribution of functions between the public and private sectors in such a reformed context is illustrated in Figure III.1.

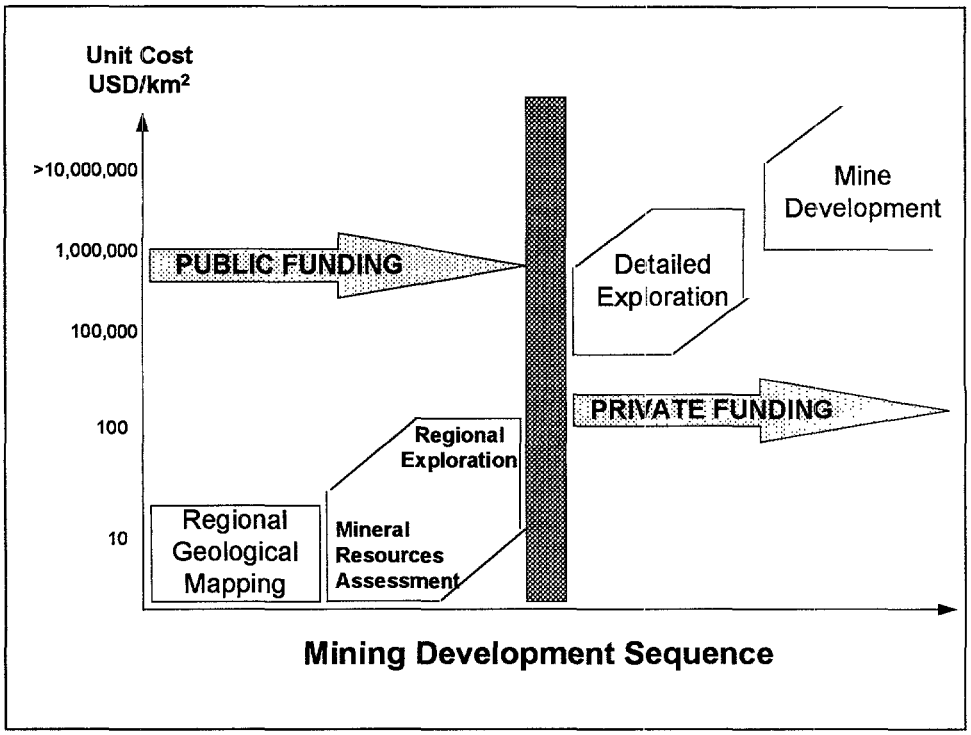

Figure III.1: Generalized Scheme Showing the Interface Between Public and Private Sectors within the Mining Sequence of a Reformed Mineral Sector

A more detailed break-down of the distribution of functions between the public and private sectors is presented in Annex 2.

This separation of functions as shown above is both necessary and effective because (i) past state-supported mineral exploration programs have proven to be ineffective, and (ii) state organizations involved in exploration have often been granted large areas of mineral rights thus blocking access to mineral resources by qualified investors. Furthermore, Geological Surveys have proven to be better able to set up and manage geoscientific teams to establish the geological infrastructure which forms a basis for private sector exploration.

Between 1970 and 1990, when the mining sectors of the LAC countries were public sector driven, the role of the PMIs was essentially relegated to a minimal cadastral function of registering existing mineral rights while the Geological Surveys (GS)

considered themselves responsible for carrying out the bulk of exploration. In many cases the GSs acted as the exploration department of the SOEs. More recently private exploration investment in LAC countries which have reformed their mineral sectors, such as Argentina, Chile, Mexico and Peru, have increased spectacularly.

B. STRUCTURE AND FUNCTIONS OF THE SECTOR INSTITUTIONS

The main functions of the PMIs in a reformed mineral sector are:

1. The definition of sectoral policy, goals and strategy;

2. The establishment of the legal and fiscal framework;

3. The definition of regulations and procedures;

4. The administration of all, laws, regulations and procedures; and

5. The establishment of a bank of reliable technical information.

The most common problems observed in unreformed mineral sector institutions are overlapping mandates and responsibilities, conflicts of interest, and political interference in administrative and technical work. A careful assignation of functions based on a clear definition of objectives and scopes of activity contributes to a climate of confidence and transparency in the administration of sectoral policy, and optimizes the use of resources. Unclear or inconsistent definition of objectives and of scope of activity weakens the institution and reduces its ability to successfully complete reforms. Such has been the case in Mexico and Venezuela where such inconsistency, in the context of a Ministry of Energy and Mines dominated by the petroleum sector, resulted in weak mining authorities. The transfer of the mining sector authority to the Ministry of Trade and Industry in Mexico in early 1995 has not yet changed the situation.

The structure of the sectoral institutions must be simple and should include the basic components described below and shown in Fig. III.2.

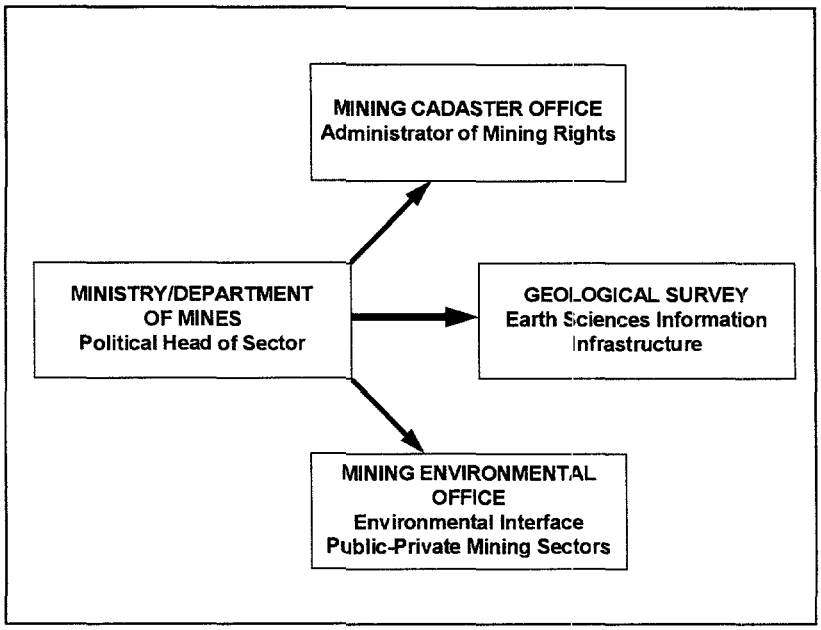

Figure III.2: Principal Institutional Components of a Reformed Mining Public Sector

1. A Ministry or Department of Mines (MM) to act as the political head of the sector responsible for sector policy and investment promotion.

2. A Mining Cadaster Office (MCO) to administer mineral rights.

3. A Geological Survey (GS) to provide earth science information.

4. A Mining Environment Office (MEO) to interface between the industry, the sectoral administration, and the overall national environmental authority. This new office has recently been established in almost all LAC mining countries

5. In some countries, a Mines Inspectorate (MI) is responsible for implementing mining sector specific occupational health and safety regulations.

B-1 THE MINISTRY OF MINES (MM)

The Ministry or Department of Mines should be responsible for mining policy; design, definition and enforcement of laws and regulations; coordination with other ministries; supervision of the other mining sector agencies/offices; compilation and publication of statistical data; and the promotion of mining activities and investment opportunities. To fulfill these roles, the MM needs a clear mandate from the government, the support of private mining interests, and the leadership of a team identified with the reform objectives.

Sound policy making, regulation and administration of the mining sector requires considerable coordination with other government departments, such as Finance, Justice, Transport, Power, Labor and Environment. Special emphasis needs to be given to establishing fluid relationships and procedures with the national environmental agency. An open dialogue with the private mining sector is also important to establish consensus regarding the definition and enforcement of viable regulations. The contribution of the

Mining Chambers who represent private industry has proved particularly valuable in this respect in Chile, Mexico and Peru.

B-2 THE MINING CADASTER OFFICE (MCO)

A well-functioning mining cadaster is essential for the effective administration of mineral rights. The MCO must be completely independent from any state entity authorized to hold, explore, develop, operate or dispose of mining properties. Personnel with legal training should direct and carry out mineral rights administration or adjudication subject to administrative supervision, and where applicable, judicial review of their decisions and acts.

The management of mineral rights involves three distinct functions which should be carried out by distinct administrative units:

1. The Mineral Concession Unit is the authority which grants or cancels the mineral right. It can be an administrative (government dependent) or an adjudicative (government independent) entity, depending on the Constitution or mining legislation of the country.

2. The Mining Cadaster Unit is responsible for cartographic control of the geographical location and time validity of mining rights. The Mining Cadaster Unit also controls compliance with the payment of fees and/or other requirements to maintain a concession in good standing, and checks applications for mineral rights for possible overlaps with earlier rights or other impediments. It also advises the granting authority if an application is technically admissible or not, or when rights should be canceled due to the failure to fulfill an obligation. A further duty is to regularly publish updated cadastral maps and/or lists of current and/or pending mineral rights with coordinates and other non-confidential information.

3. The Mining Register Unit is the office where the mineral rights are officially recorded. The mining register will record whenever a mineral right is granted, transferred or terminated

Successful implementation of the mining cadaster requires the development of a database of mining licenses with their mineral rights status, location, fees and dues paid, and other requirements. There should also be procedures for integrating geological information submitted by companies in accordance with regulations to the Geological Survey for incorporation into their database. Specific technical assistance activities needed to support the reform of the MCO are given in Annex 3.

At present, almost all LAC countries have poor topographic map coverage and/or an insufficiently developed geodetic points network. The necessity to use modern technology, such as specifically adapted Geographical Information Systems (GIS), in order to provide a legally valid information system has to be stressed. The use of satellite imagery, topographically corrected from additional control points defined by the MCO, is recommended in order to provide adequate and reliable ground control for the location of concessions. The technological transition from old to modern systems has to be carefully

planned in order to avoid potentially major legal difficulties in the definition of mineral rights. Transition procedures are outlined in Annex 4.

B-3 THE MINES INSPECTORATE (MI)

In some countries of the region an MI is responsible for the administration of the mining sector specific occupational health and safety standards. It is located in the MM itself in both Argentina and Peru whereas in Chile it falls within the Geological Survey. The MI works closely with those sections of the MEO where the responsibility for health and safety of workers is a joint responsibility. In other countries such as Ecuador and Mexico the responsibility for worker health and safety would fall outside the purview of the specific sectoral ministry, and lies within the Ministry of Labor who are responsible for all sectors.

B-4 THE GEOLOGICAL SURVEY (GS)

The role of a Geological Survey is to develop and maintain a reliable national earth science database. The GS should provide the basic geological knowledge for the mineral industry and other needs such as water resources, environmental management, land use, coastal and marine studies, and engineering works. The key components include regional geological mapping, mineral and water resources assessments, and mining related environmental and geological hazards baseline data.

The GS should also be an important mining investment promotional tool. Its main promotional responsibilities are the provision of geological information to potential investors either through the MM or directly; the systematic preparation of analyses and studies of particular relevance to the planning of exploration programs; and the dissemination of information and data in international and national technical fora and publications.

The reform of a GS aims at transforming an exploration oriented organization into one which gathers, orders and provides nationwide earth science information. This implies a change from an organization which restricted access to information to one with a transparent and open information policy. These changes affect all aspects of the institution, including the necessary skills of its professionals. The reform is therefore a major task with far reaching scope which will normally require strong technical assistance (TA) support. Recommended core activities of a reformed GS, based on the institutional capabilities of different country groups and the required TA support, are described in Annex 5.

The scope of activity of a GS will depend on national priorities. Countries with a strong minerals industry may emphasize their GS's mineral resources program. Conversely, countries characterized by environmentally sensitive areas subject to strong social or industrial stress may prioritize the development of environmental studies. Figure III.3 shows the broad organizational structure of a GS in the region.

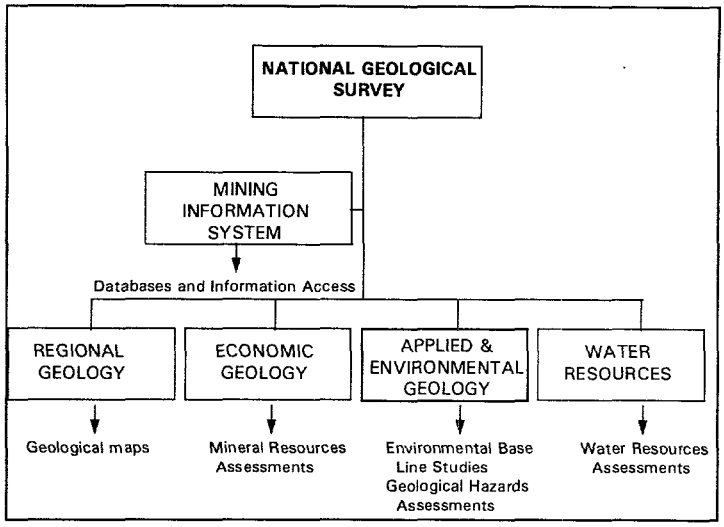

Figure III.3: Generalized Organization Scheme and Outputs of a Geological Survey in the LAC Region

The GS should be dedicated to applied research and should produce and publish maps and data which are relevant to industry and the planning authorities. The importance of publishing and disseminating results cannot be overemphasized and implies the need for resources to edit and print maps and documents professionally and in a timely manner. The GS should therefore be given a considerable degree of autonomy as the nature of its work is incompatible with lengthy administrative procedures. Annex 6 provides details for sustainable best practices for Geological Surveys.

B-5 THE MINING ENVIRONMENTAL OFFICE (MEO)

The MEO regulates and monitors the environmental performance of the mining sector either alone, or in coordination with a national multi-sectoral agency. Recent experience in the LAC region has shown that this office is an essential technical interface between the mining industry and the national environmental authorities. Its main tasks include development of sector specific environmental regulations and standards, the establishment of adequate procedures and guidelines, training of sector specialists, and monitoring of mining activities. The dissemination of information to the public is also part of the mandate.

Different approaches have been taken regarding the administrative location of the MEO and these are fully discussed in Chapter V.

C. CONSTRAINTS ON INSTITUTIONAL DEVELOPMENT AND SUSTAINABILITY

C-1 MAIN VARIABLES AFFECTING INSTITUTIONAL DEVELOPMENT

The key variables affecting the development and sustainability of sector institutions are human resources, financial resources, management quality, and the existence of a mining tradition.

It is important to note that political interference may affect all variables, particularly recruitment and management. It is a major cause of rapid turnover of staff, most noticeably at higher levels, and of short term shifts in activity and resources. Clear civil service rules and legally constraining mandates should limit frequent or drastic changes.

C.1.1 HUMAN RESOURCES

Adequate staffing is the backbone of any institution. The availability of educated and trained professionals with scientific and management capabilities within the country is a critical factor in adequately staffing an institution. The existence of mining sector service enterprises and universities provides a source of trained professionals. Sector institutions may also be able to contract support services locally.

Skills and manning needs should be identified and the necessary professionals recruited. The main focus should be placed on the senior policy oriented and executive jobs. Staff improvement should be accompanied by a parallel optimization, in most cases a downsizing, of personnel; and the implementation of pay scales competitive with private industry. Since pay normally depends on civil service rules which apply to the whole government administration, Civil Service reform is critical to the provision of adequate staffing to the PMIs. The development of a reward system based on rational criteria together with challenging and meaningful long term programs would certainly attract professionals with adequate qualifications.

C.1.2 FINANCIAL RESOURCES

Reliable resources to finance personnel, infrastructure and operations is indispensable to the fulfillment of the institutions' responsibilities. This problem is particularly acute in lower income countries and countries in economic crisis, which tend to allocate just enough to cover salaries and a few current expenses. The main sources of funds are:

1. Fiscal Resources

Funds provided through the normal government budget should ideally be sufficient to cover all expenditure requirements. However, austerity policies and the lack of a clear perception of the mining institutions' role by the financial authorities have usually resulted in a low priority in the allocation of fiscal resources. Typically, the GSs are among the most affected institutions.

2. Mineral Rights Fees

The direct allocation of part of mineral rights fees to the Mining Cadaster Office and the Geological Survey is a complementary source of financing applied in several countries (Argentina, Ecuador, Peru and, soon, Bolivia). The fees represent payment for services provided by the State to administer the mineral rights and provide the institutions with an independent and reliable source of funds.

3. Multi-lateral and Bilateral Aid Programs

International support from multi- or bilateral entities is an important source of funding for sector institutions. However, careful planning and allocation and control of these funds during and after the end of the aid program is essential if a situation of dependency is to be avoided. There have been many cases of "beneficiary" institutions collapsing when aid programs end.

4. Fees from Commercial Activities or Services

Revenues from the supply of services and from participation in mining ventures was thought during the 1970s and 1980s to be a natural complement to the government budget. However, these activities were inefficient due to poor administration and the institutions' obligation to follow civil service rules. They also generated conflicts of interest and their profitability included indirect subsidies from the State. Moreover, this competition from state entities inhibited the development of private sector service enterprises. As a result, several governments (Bolivia, Ecuador, Mexico, Peru and, to some extent, Argentina and Chile) are now transferring the provision of these services to the private sector.

C.1.3 MANAGEMENT QUALITY

Institutions generate credibility and attract support when they are thought to be well-managed. Good management is essential for correct implementation of a long term strategy, continuity of core programs, the optimal use of resources, and coordination with other entities to avoid duplication of work. The existence of a strong civil service tradition, which ensures adequate selection of personnel and budgetary priority, is a key factor in achieving adequate management quality on a sustainable basis.

Management ability is interpreted broadly here. For example, Argentina, Colombia and Venezuela can provide capable managers, even if not specialized in mining.

C.1.4 MINING TRADITION AND RESOURCES

Apart from the availability of educated and experienced human resources and infrastructure, the ability of the national institutions of the LAC region to promote and regulate the mining sector is influenced by the presence or absence of a national mining tradition.

The degree of mining tradition is a measure of the historical and actual presence of mining activities, and the existence of established mining institutions and universities. The contribution of mining to the national economy influences employment patterns and the specialties chosen by students and workers. As a result, there are normally no difficulties in finding experienced miners, technicians and engineers in the traditional mining countries of Bolivia, Brazil, Chile, Mexico, and Peru but this is not the case for example in Argentina or Ecuador.

C-2 INSTITUTIONAL DEVELOPMENT CAPABILITY

A broad and subjective estimate of the potential for effective institutional development for mining sector administration in the LAC region in the near term can be made by plotting institutional and professional capabilities against the presence of a mining tradition (Fig. III.4). The position of an individual country in this graph determines the agenda and the type and scope of activities that its institutions can be expected to pursue effectively at this time.

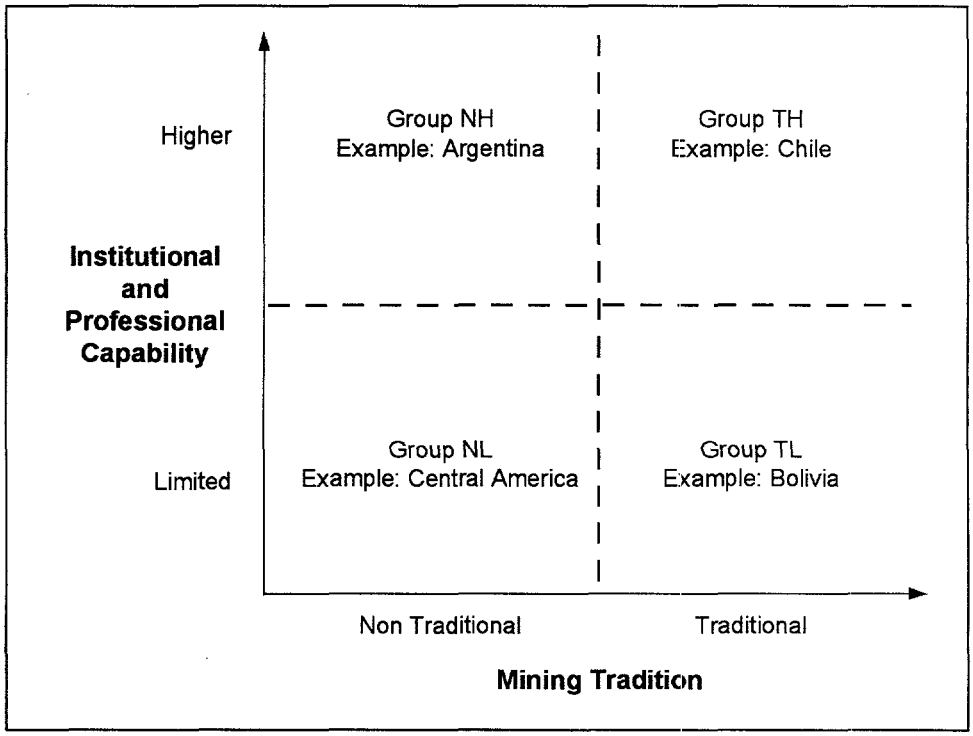

Figure III.4: Constraints on the Development Capability of Public Mining Institutions in the LAC Region

Since both variables, institutional and professional capability and mining tradition, are not discrete but continuous concepts many countries will fall in intermediate positions. Still, in order to facilitate the understanding of the presentation, the following sections focus on defining the profile and the reform programs applicable to the countries located on the four corners of the square, i.e., countries with the highest and lowest institutional and professional capability and the highest and the lowest mining tradition. Countries in intermediate positions need to interpolate, e.g., Peru a country with high mining tradition and intermediate institutional and professional capability would be located on the far right of the graph, below Chile and above Bolivia; Ecuador has no mining tradition and "intermediate" capability hence it would be located on the left, below Argentina and above the Central American countries. The following are the general characteristics of the sectoral institutions of the countries in each of the identified four corners:

C.2.1 NON-TRADITIONAL / HIGH DEVELOPMENT LEVEL - N/H COUNTRIES

The institutions have some experience and function moderately well but need restructuring to fill the role of the State in a reformed mining sector and to improve inter-institutional relationships.

There is little problem in finding capable, though not experienced, staff at all levels. Good management capability to administer and carry out work programs properly is available and there is some Civil Service tradition, making it possible to offer relatively acceptable conditions for career development. Political interference may exist at the high executive level but seldom at the technical level.

Funding is normally sufficient for a limited work program but sources of funds are not entirely reliable, and medium term shifts in availability are common. Dependency on foreign financial support is low, and low to medium for technical support.

C.2.2 NON-TRADITIONAL / LIMITED DEVELOPMENT LEVEL - N/L COUNTRIES

The institutions lack experience and do not function properly. There is a strong need for restructuring to adapt the role of the State to that required in a reformed mining sector. Mandates and activities need to be defined and overlapping responsibilities eliminated.

Adequate staffing at all levels is a fundamental problem. Limited management capability causes the administration and development of work programs to be problematic. Furthermore, there is no Civil Service tradition and the situation of civil servants is precarious and unattractive, except when foreign aid is available. Frequent political interference at all levels is often a characteristic.

Funding is insufficient to carry out even limited work programs and budget allocations can vary strongly on a yearly basis.

There is strong dependency on both foreign financial and technical assistance.

C.2.3 TRADITIONAL/HIGH DEVELOPMENT LEVEL - T/H COUNTRIES

The institutions are comparatively well-developed, experienced and perform acceptably. There is a need to modernize the organizational structures and to better define inter-institutional relationships to improve efficiency. Mandates and activities also need to be examined to avoid overlapping of functions when they occur.

There is little problem in finding qualified professionals. Good and specialized management capability is available which facilitates administration and work program execution, and there is some Civil Service tradition, creating acceptable work conditions and career development opportunities. Political interferences may exist at the higher executive level but seldom at the technical level.

Budget allocations are normally enough to finance long term core programs but the source of funds is not entirely reliable and medium term shifts in availability are common.

Dependency on foreign financial support is low, and low to medium for foreign technical assistance.

C.2.4 TRADITIONAL/LIMITED DEVELOPMENT LEVEL - T/L COUNTRIES

The institutions have limited experience and have difficulties in performing properly. They need to be restructured to adapt to the role of the State in a reformed sector and to improve inter-institutional relationships. Mandates have to be refocused to avoid overlapping of functions.

Adequate technical staff, though not always technologically updated, are available. Management capability is relatively low, which affects administration and implementation of work programs. Additionally, there is no Civil Service tradition, and the situation of civil servants is precarious, except when foreign aid is available. There may be frequent political interference at the high executive level and, less frequently, at the technical level.

Funding is not sufficient to carry out normal core program activities.

There is strong dependency on foreign financial support, and medium dependency on foreign technical assistance.

D. THE IMPLEMENTATION OF INSTITUTIONAL REFORM

D-1 THE PROCESS OF REFORM

To succeed, the sectoral and institutional reforms need to be part of larger economic reforms and the sustainability of the PMIs depends on the development of an adequate civil service.

The commitment to reform needs consistent leadership from the top: from the mining minister, other ministries, principally the Ministry of Finance, and the heads of the mining sector agencies. Reform implementation may take time and the support of individuals in positions of power over the duration of the commitment is critical. A carefully prepared timetable will be required to complete a significant institutional reform and ensure success over the long term. Furthermore, the management and staff of the sectoral entities need to fully identify themselves with the objectives of the institutional reform and development program.

An initial step in the reform of sector institutions is a comprehensive sector assessment which should include an analysis of the institutional capabilities of the country concerned and must cover the following areas:

1. Definition of institutional objectives;
2. Identification of required activities;
3. Assessment of available human, technological and financial resources;
4. Identification of capability gaps and means to fill them; and
5. Definition of work programs and the development plan.

Strict prioritization and selectivity need to be applied in the design of an institutional development plan. A selective approach which identifies areas in which progress is feasible in a reasonable period (say 3 to 5 years) is likely to yield better results than an over-ambitious program which tries to address all the identified problems simultaneously. For example, Argentina and Peru prioritized the strengthening of the Mining Cadaster Office and Mining Environmental Office due to the fast pace of their mining sector development. The Geological Surveys were given secondary priority and will be developed at a slower pace, initially focusing on core programs.

D-2 MAIN PRIORITIES AND AGENDA FOR INSTITUTIONAL REFORM

The design and complexity of an institutional development program needs to take into account the managerial and institutional capabilities available. Aside from the need to develop or strengthen the Civil Service and to establish or consolidate a stable source of funding for the PMIs, both prerequisites which apply to all countries, the design of a program needs to be tailor made. A program that is feasible in some environments could be impracticable in others. Nevertheless, the setting up of an adequate, modern policy and legal framework is an absolute pre-requisite to institutional reform in all cases. The characteristics of the PMIs in the four different country groups described permit general guidelines and priorities to be set according to each group's circumstances. These general priorities can be divided into the requirements of the Ministry or Department of Mines and those of its departments.

D.2.1 NON-TRADITIONAL/HIGH DEVELOPMENT LEVEL - N/H COUNTRIES

1. General priorities applicable across the sector

   i. Develop or restructure, modernize and re-focus the sectoral institutions.
   ii. Develop the information infrastructure (Geological data base and Mining Information System).
   iii. Upgrade capability in new technologies (e.g., GIS, satellite imagery processing) and other specialty skills such as mineral resource assessment.

2. Priorities for specific institutions

a) Mining Sector Authority

When the mining potential justifies it, the mining sector authority should be established and/or restructured within another Government entity e.g. the Ministry of the Economy or of Commerce. Policy making, regulation development and sector monitoring capabilities should be strengthened.

b) Mining Cadaster Office:

An MCO should be established to fulfill the legal and technical functions of a mining cadaster using modern standards and technology. Its size and complexity should depend on that of the country's mineral sector. While ultimately responsible to the mining sector authority, the MCO must be administratively autonomous.

c) Mining Environment Office:

A formal office should be established within the entity responsible for sector policy to coordinate with the overall environmental authority. This coordination will cover sector specific policies, regulatory and monitoring instruments, and relations with the mining industry. Its size and authority will depend on the importance of the country's mineral sector.

d) Geological Survey:

An autonomous GS should be established with activities initially limited to core programs. Complexity can be developed later depending on resources and needs.

D.2.2 NON-TRADITIONAL/LIMITED DEVELOPMENT LEVEL - N/L COUNTRIES

1. General priorities applicable across the sector

   i. Develop a modern, simple and efficient sectoral administration.
   ii. Develop a simple information infrastructure (Geological data base and Mining Information System).
   iii. Upgrade capability in institutional management and in basic (e.g., geological mapping, map production) and adapted new technologies (e.g., GIS).

2. Priorities for specific institutions

For this group of countries, the establishment of a complete institutional framework comprising the four basic components as separate and autonomous entities should be evaluated against the availability of human and long term financial resources, and the priority given to mining development in the country. Less costly options should be considered, such as for example, the integration of the MCO, MEO and GS into a single autonomous entity subject to a Mining Directorate within a Ministry of Industry or of Economy. Alternatively, and particularly for countries with limited mining potential, the MCO might be located within a larger cadastral entity (e.g., rural), the MEO as a small specialized group within a central environmental authority, and the GS as part of a natural resources cross-sectoral entity.

D.2.3 TRADITIONAL/HIGH DEVELOPMENT LEVEL - T/H COUNTRIES

1. General priorities across the sector

   i. Modernize and re-focus the sectoral institutions.
   ii. Improve the information infrastructure.

Upgrade capability in new technologies (e.g., GIS, satellite imagery processing) and other specialties (e.g., mineral resource assessment and environmental base line studies).

2. Priorities for specific institutions

a) Ministry of Mines:

A Ministry or Secretariat of Mines should be established and policy making, regulation development, and sector monitoring capabilities strengthened.

b) Mining Cadaster Office:

An MCO should be established and/or strengthened to be able to handle complex inherited problems. The MCO must, to the extent possible, be administratively autonomous of the MM.

c) Mining Environment Office:

A formal office should be established within the MM to coordinate with the overall national environmental authority. This coordination will cover sector specific policies, regulatory and monitoring instruments, and relations with the mining industry. Its size and authority will depend on the importance of the country's mineral sector.

d) Geological Survey:

An autonomous GS should be established. The number and complexity of activities should be initially limited to core programs. If sustainable, complexity can be progressively increased depending on needs and resources.

D.2.4 TRADITIONAL/LIMITED DEVELOPMENT LEVEL - T/L COUNTRIES -

1. General priorities across the sector

i. Restructure, modernize and re-focus the sectoral institutions.
ii. Improve the information infrastructure.
iii. Upgrade capabilities in institutional management, adapted new technologies (e.g., GIS, satellite imagery processing) and other specialties (e.g., modern techniques in mineral resources assessment and environmental base line studies).

2. Priorities on specific institutions

a) Ministry of Mines:

A Ministry or Secretariat of Mines should be established and making, regulation development and sector monitoring capabilities strengthened.

b) Mining Cadaster Office:

An MCO should be established and/or strengthened to be able to handle complex inherited problems. The MCO must be administratively autonomous of the MM.

c) Mining Environment Office:

A formal office should be established within the MM or equivalent to coordinate with the overall environmental authority. This coordination will cover sector specific policies, regulatory and monitoring instruments, and relations with the mining industry. Its size and authority will depend on the importance of the country's mineral sector.

d) Geological Survey:

An autonomous GS should be established. The number and complexity of activities should initially be limited to core programs to ensure long term sustainability.

Annex 7 illustrates the requirements for a sustainable institutional framework together with order of magnitude budget estimates for the different country groupings.

D-3 KEY CONSIDERATIONS AND FOCUS OF TECHNICAL ASSISTANCE

If the LAC countries are to successfully administer their mining sectors for the maximum benefit of their own economies and attract both local and foreign investment to the sector, they must strengthen their PMIs. The key components of technical assistance which has been extended by the World Bank have been built around the model in the table below.

Table III.2: Key Components of World Bank Supported Institutional Development TA Projects

Component	Group of countries			
	TH	TL	NH	NL
Assistance in the formulation of reformed policy and legal frameworks (incl. exposure to modern policies and legal frameworks)		O	O	O
Restructuring of the institutional framework		O	O	O
Re-focusing and strengthening of the institutional framework	O	O	O	O
Setting up of a modern cadastral management system	O	O	O	O
Setting up of a sectoral environmental management system		O	O	O
Setting up of a mining information system	O	O	O	O
Setting up of an earth-science information infrastructure (see also Table 5).		O	O	O

While the institutional needs can be identified relatively easily, the design of Technical Assistance (TA) programs must consider several factors if the program is to have a reasonable chance of fulfilling its objectives. Key considerations in project design include

project complexity, availability of the necessary local funding to implement the project, project sustainability, and coordination between donors.

When a potentially desirable project does not appear feasible its complexity should be reduced by: (a) dividing it into separate components or subprojects that can be implemented and operated independently; (b) implementing the project in phases; (c) using pilot projects when the best approach is not clear at the outset; or (d) using minimum packages. An example of (a) might be dividing a mapping project into separate geological, geophysical and thematic mapping sections. An example of (b) might be privatization of a mining SOE, which starts with a tender for technical and financial consultants, is followed by technical and financial evaluations, a marketing exercise, and a final bidding process. An example of (c) is the pilot environmental project being undertaken in Oruro, Bolivia, under World Bank auspices. It is important to set limited targets and distinguish between those components which are central and should be kept, and those which are subsidiary and can be left out.

Among the financial aspects of TA programs for PMIs that must be considered is the availability of local funds. Many bilateral donors and lending institutions are willing to finance TA projects without ensuring the availability of the local funding required for the daily operation of a project. It is better to reduce the amount of capital spending and ensure the provision of operational funding, as capital investments which cannot be properly applied could well be a waste of resources.

Planners and international aid agencies need to recognize that only those activities which are compatible with the institution's human and financial resources will be sustainable in the long-term. TA in N/L countries suffer severely from inexperienced and constantly changing staff, insufficient financial support and inadequate infrastructure. Under these conditions even uncomplicated projects such as the continuation of geological mapping can collapse when bilateral or multi-lateral TA terminates. Maintenance of simple core activities such as updating earth science information for mineral development, environmental and multi-disciplinary purposes, and the management of mineral rights will be required, and consideration must be given to the capability of the PMIs to continue this work in the post-TA stage. Failing to take account of the possible loss of project momentum when TA ends is a frequent shortcoming in many internationally and bilaterally sponsored mineral sector projects. A classic example is the establishment of laboratories which cease to function properly as soon as TA ends.

The lack of a coordinated mineral sector reform approach by the donor community has often resulted in donor or lending entities tending to support one institution and/or seek to mitigate one development constraint, or strengthen one specific technical activity. Rarely do they take much account of overall sector development goals or institutional development capabilities. However, increased coordination between multi- and bilateral agencies in project design and implementation can be observed in several cases.

CHAPTER IV: ENCOURAGING LOCAL MEDIUM AND SMALL MINERS

A. INTRODUCTION

The institutional and legal reforms of the mining sector currently being undertaken by the governments of the LAC countries aim at encouraging private investment, both foreign and local. A fundamental aspect of these reforms is that they should not discriminate between foreign and local investors. Hence it is of fundamental importance that, in addition to encouraging foreign investment, the reforms should encourage the development of a local, predominantly nationally-owned mining industry. However, in most countries development of local mining has been severely constrained by the circumstances under which it has had to operate during the last quarter century of nationalistic political and economic policies, and the dominance of state-owned mining enterprises.

The existence of a strong local mining industry complements foreign investment in the sector because the major international mining companies are usually only interested in, or prepared to devote the management time and financial resources to, developing major deposits. They are not usually interested in the exploitation of more complex smaller orebodies where local miners have traditionally excelled. Without a strong local mining industry a country's mineral resources are therefore unlikely to be fully exploited. The existence of a strong local mining base also makes it easier for international companies to find partners local expertise for the benefit of both parties.

The Medium and Small Miners of the LAC region have not yet developed to anything like the degree of their counterparts in Australia, Canada and the United States. In Mexico some private local groups like Peñoles and IMMSA can be classified as medium to large-scale mining enterprises, but these are the successors to the old Mexican subsidiaries of AMAX and ASARCO respectively. Elsewhere, the best of the Medium Miners are only now beginning to take advantage of the newly liberalizing environments to form joint ventures with foreign mining companies and to prospect on their own account. Most have suffered from lean times over the past quarter century. Many have emerged with highly geared balance sheets and some have been fortunate to survive. The Small and Artisanal Miners have largely been neglected.

This chapter looks at the current status of local mining companies in the LAC region, examines the constraints under which they have had to operate, and in some respects still do operate, and considers what policies could usefully be adopted to promote the development of existing local mining companies and promote the formation of new ones.

B. STRUCTURE AND NATURE OF THE SECTOR

Operations of the local mining industries of the LAC countries vary in scale from one man artisanal workings producing a few grams of gold or tin a day, through cooperatives and small mines treating a few tens of tons a day, to major enterprises with multiple operations, often highly mechanized, treating thousands of tons a day. These operations encompass all conceivable mineral products: construction materials, base metals, precious metals, and coal. They also encompass the three main types of mining: alluvial, open pit and underground.

The local mining enterprises can be divided into three broad categories:

1. Medium Miners (MEDM) with one or more operations up to about 5,000 t/d and annual sales from $10 to $100 million/yr.;

2. Small Miners (SM) with operations of up to 1000 t/d and annual sales of up to about $10 million/yr.; and

3. Artisanal Miners (AM).

Given the varied nature of the operations involved, the categories overlap considerably. Not to be confused with this classification are the definitions used in different countries of the region. For example, the Medium Miners Association in Bolivia embraces most of the country's private miners who between them have only three operations treating over 1,000 t/d. A mine of 500 t/d is considered a big mine in Bolivia but would rank as a small mine in Chile or Peru. Still, economies of scale which apply equally and rigidly in all countries are a key factor in defining the viability of the different types of mining operations.

The relative size of the three categories varies enormously from country to country. Mexico and Peru have well established medium and small mining sectors but in Chile the medium mining sector has only recently begun to grow in importance. There is little in scale between the large operations of Codelco and the major international groups, and the small mines. In Bolivia, Brazil, Colombia and Peru, artisanal mining accounts for a significant proportion of production, while in Chile and Mexico artisanal mining has only minor importance.

B-1 MEDIUM MINERS

The Medium Miners are important players in the traditional mining countries of Bolivia, Chile, Mexico and Peru. The largest of them have several operations, often producing a variety of products, have able technical staff and are professionally managed. Ownership is usually spread although there is frequently one major shareholder who has a dominant influence on business affairs. Some are quoted on local stock markets and several have recently formed joint ventures with international groups. However, most have not yet made use of the instruments available in the financial markets. The degree of mechanization and technical advancement varies but it should be realized that it is difficult to mechanize many of the narrow vein underground mines which most of these companies operate.

Examples of Medium Miners include Sabinas, Tayahua and Minas de Bacís in Mexico; Buenaventura, Milpo and Minsur in Peru; Comsur and Emusa in Bolivia; Las Cenizas, and the Gordo and Luksic groups in Chile. These companies are well placed to take advantage of the new opportunities opening up.

B-2 SMALL MINERS

There are two types of small miners in the LAC region: (i) those legally constituted, which operate in the formal sector (SM); and (ii) informal mechanized operations (ISM).

B.2.1 FORMAL SECTOR (SM)

The Small Miners in the formal sector are legally constituted, typically operate a single mine, and are usually family-owned operations. Unless mining exceptionally rich deposits, they have typically lacked the resources to either develop their orebodies sufficiently, to ensure proper technical control of their operations or to install the required safeguards to protect the environment. Output has been insufficient to create adequate economies of scale and profits are meager. Weak management is a central characteristic of small mechanized mining enterprises. In many cases owners have been more concerned with maintaining their incomes than with developing their properties, protecting the environment and becoming true mining entrepreneurs. Under such conditions, full utilization of technical management has not been a priority of the SMs. Hence, the growth possibilities of SMs are largely confined to associations with foreign investors or MEDMs which may be interested in their deposit for future expansion.

Many small mines have survived because of the subsidized credit policies of the now defunct Mining Banks and other subsidies. For example in Chile, as part of government policy to support small mines in the north of the country, Enami, the state-owned smelter charged with overseeing the sector, reduced treatment charges for copper concentrates produced by small miners during times of low copper prices and compensated by raising charges at times of high copper prices. This protected the miners at the bottom of the price cycle but penalized them at the top, thus restricting their chances of accumulating capital. In Bolivia, Mexico and Peru the lax credit policies of the Mining Banks, which are discussed in Section C.3.1, allowed the continued operation and expansion of many, at best, marginal operations.

B.2.2 INFORMAL MECHANIZED OPERATIONS (ISM)

In addition to the small miners in the formal sector there are some mechanized operations which are not legally established. These informal small mines are typically remotely located operations, normally owned by a single person or family, and are characterized by tax evasion, non-compliance with legal requirements, including social security and environmental protection, although in many cases they have legal title to the land they work. The ISMs evade law enforcement through the corruption of local officials, helped by the remote location of their operations.

The ISMs are characterized by weak management accompanied by no long-term planning. Investment is typically limited to earth-moving equipment, which later can be used for construction. Little or no investment is made in long-term assets such as ore dressing

facilities or in activities such as exploration. Environmental protection and social considerations are simply ignored.

Since the 1980s, the ISMs have become important gold producers, notably in Brazil and Colombia, although in both countries their production is in decline. Since 1990, the ISMs in Madre de Dios have become important producers and currently account for about 40% of Peruvian gold production.

B-3 ARTISANAL MINERS

Artisanal Miners are characterized by their informality. In most cases they have no legal title to the deposits they work, and even where they are entitled to legal mineral rights they often do not make the effort to obtain them. Thus artisanal miners are heavily restricted in their ability to obtain finance and technical help.

In places, artisanal miners are organized into cooperatives but this is often just a subterfuge to obtain some legal recognition. The miners continue to work individual plots on the communal property. In Bolivia, Chile and Peru large numbers work abandoned mines, small outcrops and waste dumps for copper, lead, zinc and tin, but by far the largest number are involved in the alluvial mining of gold, frequently with disastrous environmental results. On the positive side they are often entrepreneurial and have proved their worth as explorationists. Therefore, any policy to help develop a national mining industry must look at ways of integrating artisanal mining into the formal sector, primarily by encouraging the more entrepreneurial among them to move up to become small miners.

C. THE REASONS FOR STAGNATION

Some of the reasons for stagnation have been outside the direct control of the Small and Medium Miners. The political and macroeconomic climate and the lack of finance have been very significant factors contributing to the stagnation. However poor management has also been an important factor in explaining the poor performance of the Medium and Small Miners. These factors are discussed below.

C-1 POLITICAL AND MACROECONOMIC FACTORS

In the late 1960s, many of the countries in the LAC region began to adopt policies of economic nationalism. "Strategic industries" were nationalized, tariff walls went up to protect local industry, and strict foreign exchange regulations were brought in. For the mining industry, the process began in earnest when Chile nationalized the four major copper mines. A similar pattern was followed in other LAC countries.

The newly created mining SOEs were given preference in the availability of increasingly scarce foreign exchange and sometimes fiscal preferences. COMIBOL in Bolivia for example, which was established much earlier in 1952, had a higher "presumed cost of production." This meant that it paid lower royalties than the privately owned Medium and Small Miners. Furthermore, large areas of land were often reserved for potential future exploration and exploitation by the mining SOEs, which not only assigned a low priority

to exploration but, most importantly, never established a comprehensive geological database.

The closed macroeconomic policies adopted by successive governments did not provide the necessary economic growth and were interspersed with periods of populism, fiscal irresponsibility and monetary profligacy. The result was a highly unstable economic environment, which made it difficult to plan. This was accompanied by restrictions on imports, taxes on exports, and often high inflation and dual official and black market exchange rates which affected exporting industries, such as mining, particularly negatively. International mining companies were discouraged and foreign investment in most industries was reduced to a trickle. Local manufacturers and mining companies were left to fend for themselves as best they could.

Within this environment, it was not surprising that international mining companies focused their exploration and mining development efforts elsewhere, e.g., Australia, Canada, and the USA. This caused a fall in exploration in the LAC region and hence in the number of smaller prospects discovered which might have been suitable for development by the Medium and Small Miners. The departure of the international mining companies also deprived local Medium and Small Miners of regular exposure to technical developments and modern management techniques with a consequent atrophying of these aspects of their operations.

The combination of lack of access to exploration land, loss of exposure to modern technical developments and management techniques, and the financial squeezes generally forced the Medium and Small Miners of the LAC region to concentrate on their existing operations. New developments were few, partly because it was more profitable and less risky to conduct financial transactions. The end result was the deterioration of the financial condition of the MEDMs with their assets and equity diminished and their balance sheets heavy with short term debt.

C-2 MANAGEMENT FACTORS

The political and macroeconomic factors have been the major cause of poor performance by the Medium and Small Mining sector but poor management has also contributed. The larger MEDMs and some selected, smaller MEDMs have usually had adequate technical staff and are professionally managed by a well balanced group of full time managers backed by consultants as required. These enterprises normally adopt long term policies, invest only after a full formal feasibility study, exercise tight control over production costs, and have sales policies designed to maximize their revenues. However, as the newly liberalized financial markets begin to offer access to more economic sources of funding, their financial managers have generally lagged behind their counterparts in other sectors. Few as yet have made use of the financial instruments now available in the capital markets.

The SMs and less qualified MEDMs, which are frequently family owned or controlled, have usually neither had the production level to be reasonably profitable, and so the funds to reinvest, nor the technical and professional competence to manage their operations wisely. It is this management gap which most clearly separates MEDMs from SMs. Family ownership does not preclude professional management but invariably the most

successful MEDMs and SMs are those where a clear separation exists between a professional management team responsible for operations and the owners at Board level responsible for strategic and financial control.

All too often, the Mexican and Andean MEDMs failed to recognize that mining is a technically complex industry which even when professionally managed is a complex business. Frequently, the need for cash flow caused the extraction of immediately available ore and delayed the development of new reserves. Exploration programs were wound down or canceled so that new projects necessary to sustain the company never came to fruition. Sometimes expensive concentrators were built without the proven ore reserves to feed them.

The failure of many MEDMs and SMs to accept that mining is a capital intensive industry which requires sophisticated financial management has contributed to their poor performance. Metal prices are notoriously volatile and mining companies depend on making good profits in times of high prices in order to tide them over the usually much longer periods of low prices. This requires tight control of production costs, attention to sales contracts, and perhaps adopting hedging policies to give some degree of stability to revenues. It also means equity funding as far as possible, particularly for the high risk exploration stage of ventures.

C-3 FINANCIAL FACTORS

Once access to foreign capital dried up, there was no local capital to take its place. Unstable economies and often high inflation meant that people only invested in short term instruments and the local banks were therefore starved of long term funds. This made long-term financing with local resources extremely difficult. Furthermore, the limited amounts of long-term capital available were often constrained from investing in mining by legal or administrative restrictions on funds being invested in "high risk" activities. Local entrepreneurs generally preferred to put their cash into ostensibly more profitable industries or engage in pure financial speculation.

C.3.1 THE MINING BANKS AND THEIR DEMISE

During the nationalistic era, the governments of the mining countries of the LAC region tried to promote small and medium mining by providing access to subsidized credit and services. The subsidized credit schemes were funded by multilateral credit institutions and channeled through Mining Banks (MBs) which acted as first tier financial intermediaries, assuming the full credit risk for the loans they approved. In addition, the MBs tried to support small mining by providing it with other services, deemed to be critical, such as marketing of ores and concentrates, provision of mining equipment and toll dressing of ores in "regional" concentrators.

The application of these "provide access to credit and critical services" policies was, by and large, non-focused and politicized and had negative impacts on the development of mining in the region. Firstly, it gave credit to borrowers who were uncreditworthy. Secondly, the provision of services did not address any of the known management weaknesses of the SMs. By not establishing stringent management, financial and technical standards the MBs failed to contribute to the modernization of the mining enterprises or to

their financial discipline. Instead, substantial amounts of scarce resources were provided to under-qualified groups and spent on marginal projects. In addition, MB credits and the location of the state owned and operated regional concentrators were decided largely on the basis of political considerations.

The MBs of the region failed because of: (i) misguided objectives; (ii) bad administration; and (iii) inadequate interest rate policies. These objectives were seldom, if ever, questioned by the donor community. The salary levels of the managers and professionals of the MBs responsible for the approvals and supervision of the projects were equivalent to those of public sector employees. Such salary policies resulted in poor management and facilitated corruption. Most importantly, the concept of a development financial institution was interpreted by the MBs as having to provide financing at below commercial interest rates and adopting flexible policies with respect to loans in arrears. This resulted in corrupt behavior by the MBs as political interference resulted in widespread credit indiscipline and bad-faith transactions. The MBs ended up with major losses as loans went into arrears. Many eventually became bankrupt.

C.3.2 MINING CREDIT IN THE AFTERMATH OF THE MINING BANKS

The closure of the state-owned Mining Banks, which provided small and medium mining with access to longer-term credit, has severely effected the financial structure of the MEDMs due to the lack of alternative long-term resources in the local commercial banks. The solution to this problem is not simple. While directed and subsidized credit should be avoided, the banks do not have long-term resources because the local markets save and invest only in short-term instruments. In addition, short-term lending rates are high due to the high operating costs and the high profits currently being achieved by banks in many LAC countries.

Legal and administrative restrictions on the investment of long-term funds in "high risk" activities also remain a problem yet the perception of mining enterprises as high-risk borrowers is largely a consequence of ignorance, since a properly appraised and well managed mining project is not necessarily riskier than projects in other sectors. This perception has persisted because of lack of institutional expertise and experienced mineral sector portfolio managers in the commercial banks, which is attributable to old regulations which limited the use of mining assets as collateral, and to the historical widespread credit indiscipline of the Small and Medium Miners. Furthermore, in spite of recent reforms to the Mining Codes of the region which have facilitated the use of mining assets as collateral, the commercial banks are not yet accepting mineral rights with proven reserves as collateral for their loans. This severely restricts access by the MEDMs to credit since only urban real estate or equipment with evident resale value are considered acceptable.

The only other sources of commercial credit for the sector are the ore and concentrate traders and local smelters. The traders lend money as advance payment against the delivery of ores or concentrates. These advances typically amount to 25% to 30% of the value of production so credit is guaranteed at all times.

D. LESSONS FROM OTHER COUNTRIES

It is clear that the major reason for poor performance of the Medium and Small Mines sector in the LAC region has been the unhelpful political and economic climate in which it has had to operate for the past 25 years. This climate is changing and it is reasonable to expect that, provided the institutional and legal reforms currently being undertaken are properly and comprehensively implemented, the investment climate will be liberalized resulting in the removal of these constraints.

These reforms have already taken place in Chile and are underway in Peru. As a consequence investment banking has recently begun to provide selected MEDMs in Chile and Peru with new options to access long-term resources. These instruments, which are discussed below are based on raising risk capital or on accessing credit through direct intermediation. These instruments have been known for a long time but could not be used in an unstable, inflationary and highly regulated environment. In the new, more stable context they are necessary to complement the traditional instruments (commercial banking, development banking and own-resource financing), since the limitations of the financial systems of the region are likely to persist for some time.

However, it takes time for investor confidence to return. In the meantime, actions are required to stimulate development of the local MEDM and SM sector, and help the Artisanal Miners, regardless of whether significant foreign investment in mining arrives. This means alleviating the constraints on access to capital and credit, of deficient management, and more importantly, stimulating the formation of an entrepreneurial mining culture.

D-1 ENTREPRENEURIAL CULTURE

It is the existence of an entrepreneurial mining culture which seems to have been the driving force behind the upsurge of exploration activity in the three key developed mining countries - Australia, Canada and the United States -which has been witnessed over the past 15 years. All three countries have long had a favorable climate for mining with clear rules governing exploration and exploitation concessions, stable currencies, and access to credit and capital but until the late 1970s their mining industries were dominated by a number of large, long established mining companies: Asarco, CRA, Noranda etc. There were few independently owned and operated small and medium mines.

In the 1980s the structure of the industry changed. Numerous "junior" mining companies were formed by out-of-work geologists and engineers (the low metals prices of the late 1970s had forced all mining companies to radically reduce their costs structure and postpone new projects). An additional stimulus was the steep rise in the price of gold. However, it also coincided with major technical advances, notably remote sensing in all its forms and the availability of cheap computing power which made it possible to manage and manipulate enormous amounts of data.

A pattern evolved of junior mining companies carrying out exploration, and then, because they usually lacked the financial and technical resources to develop a mine, selling an interest to one of the major groups. This emergence of junior mining companies can be

likened to the great gold rushes of the nineteenth century to which so many of today's major mining groups owe their origins.

These junior mining companies have tended to concentrate their headquarters in a few cities - notably Perth in Australia, Vancouver and Toronto in Canada, and Denver in the USA - thereby creating a synergistic critical mass of like minded individuals interacting and feeding off each other's ideas which has helped drive the industry forward. They were able to be formed because of the presence of the necessary technical staff; an active market in mineral properties which could be transferred, sold or mortgaged; and the availability of risk capital. Risk capital has been available privately from individuals or could be raised on the stock exchanges, of which the Vancouver Stock Exchange is perhaps the most famous, or notorious.

D-2 THE ROLE OF MERCHANT BANKS

In contrast with commercial banking, which attracts savings from the public and provides credit with its own resources, the merchant or investment banks structure credit operations by bringing together, through direct intermediation, those agents who save and have financial excedents (suppliers) with those who require financing (demandants). The merchant banks provide advice to mining enterprises in the design of a financial strategy and structure, and in the use of specific financial instruments to ensure the best fit with their particular needs. The merchant bank may also raise finance for its clients through the negotiation, trading or underwriting of stock or debt paper issued by the client. The instruments used by the investment banks to raise funds are well known: common stock, preferential stock, American Depository Receipts (ADRs), local bonds, convertible bonds, eurobonds, etc. Any of the above services of the merchant banks can be given in the context of corporate financing, mergers and acquisitions, consolidations, project financing, loan syndications or the administration of funds or assets.

D-3 AVAILABILITY OF GEOLOGICAL INFORMATION

One of the reasons why Australia, Canada, and the United States have continued to attract investment in mining is that there is a great deal of geological knowledge which has been collected over many years by government agencies and private companies and which is available for inspection for a nominal fee. This greatly facilitates the work of explorationists in choosing target areas. The collection and publication of geological and geophysical information continues at a great pace in these countries. A good example is South Australia where the Government has expended significant sums and seen a resultant large increase in exploration (see Box IV.1).

Box IV.1: South Australia Government Exploration Program

In 1990 the South Australian government realized that it was rapidly becoming the poor relation of other Australian states when it came to exploration The reason was not bad laws or a hostile environment to mining but the geological fact that over 70% of South Australia's 800 000 km^2 is covered by shallow drift sediments which make exploration difficult and expensive

The result was the South Australian Exploration Initiative. a program funded by the Department of Mines to obtain the basic geological and geophysical information desired by mining companies The cornerstone of the program has been the regional aeromagnetic surveys over the entire state. backed up by geophysical. gravity and seismic surveys. and the implementation of a geographic information system The data is made available to industry at the nominal cost of $A0 01/line-km

Approximately $A25 million has been spent on this project since 1990. and expenditure is continuing at a rate of $A2.5 - $A3 0 million/yr To date. about 60% of the state has been flown and 40% of this area has subsequently been taken up by exploration licenses The area held by exploration licenses has risen from 200.000 km^2 in 1991 to over 350 000 km^2 in 1995 Over the same period. exploration expenditures have risen from $A10 million to $A25 million/yr and several significant discoveries have been made So successful has the initiative been that it is now being copied by other Australian states

E. APPLYING THE LESSONS

Concurrent with the establishment of a competitive and equitable legal and fiscal regimes administered by a competent and effective PMI, it will be necessary to put in place the economic and political environment described above under which Medium and Small Miners can thrive. Initial steps would include the ones described below.

E-1 ENTREPRENEURIAL GROUPS

Senior and junior mining companies are now extending their activities into Central and South America. The question is "How can similar entrepreneurial groups of local small and medium miners be formed in the LAC region?"

The nucleus of an entrepreneurial group of small and medium mining companies already exists in the major mining countries of Bolivia, Chile, Mexico and Peru. Some of these companies are already taking advantage of the new open environment by forming joint ventures with foreign companies for exploration and raising fresh capital locally and overseas.

In the non-traditional mining countries creation of a critical mass of entrepreneurial miners is more problematic. In these countries, local miners are largely artisanal (e.g., Ecuador) or involved in earth moving operations for the extraction of construction materials (e.g., Argentina). Colombia and Venezuela have large numbers of artisanal miners and a few large, either foreign or state-owned, operations but little or nothing that could be classed as Medium Mining. International mining companies consequently have difficulty finding suitable local private partners.

In these countries, the obvious long-term source for the establishment of a viable medium mining segment is from among those enterprises in other sectors, especially those which work close to the mineral sector. The construction sector is one. Most of the existing medium-sized Chilean mining enterprises were originally construction contractors of major foreign companies. Those which have successfully entered the mineral business had the management and financial expertise to undertake a medium-sized mining operation and acquired their technical know-how through their association with foreign groups and by recruiting their own technical people.

E-2 ACCESS TO INTERNATIONAL CAPITAL

Association with foreign mining companies is one way of strengthening the Medium Miners of the region and is already happening. For example, Buenaventura with Newmont in Yanacocha, Milpo and Simsa with Phelps Dodge in various exploration projects, Las Cenizas and Comsur with RTZ, and Emusa with Battle Mountain in the Kori Kollo mine. International mining companies have either taken equity stakes in the companies concerned or equity stakes in specific joint ventures. They bring with them access to the international capital markets and modern management and technology, which benefits the MEDMs. In return, they reduce their political exposure and obtain a partner with local knowledge and expertise. Increased foreign investment in this way could prove a very important factor in strengthening the MEDMs of the LAC region.

E-3 ACCESS TO LOCAL FINANCIAL RESOURCES: INVESTMENT BANKING AND VENTURE CAPITAL

In the longer term, a strong local Medium and Small Mining sector needs to complement its access to international capital with access to local financial resources. In this sense, the importance of the initial activities of investment banking in Chile, Mexico and Peru cannot be exaggerated. Similarly, further ahead, local venture capital markets similar to those operating in Australia, Canada and the United States, need to be developed.

There are positive signs that the local capital markets will become more active and capable of funding new undertakings. In addition to the new presence of the merchant banks, the most significant is the development of private pension funds (AFP) to replace state pensions. Workers in Argentina, Chile and Peru are obliged to contribute a fixed percentage of their wages, which would formerly have been a social security contribution to the state, to privately administered pension funds. The process is most advanced in Chile where the AFPs now have huge holdings.

The AFPs are strictly governed by rules which specify what may be invested in and the proportions of holdings that must be held in government bonds etc. However, even if investments in qualified mining enterprises are permitted by the AFP rules, there are very few opportunities for investment in mining in the region. The only LAC exchanges where a significant number of mining stocks are quoted are in Peru (Lima) and Mexico (Mexico City). There are no mining companies quoted on the Santiago stock exchange. (Antofagasta Holdings plc, the parent company of the Luksic group which has numerous mining operations in Chile, is quoted in London but not Santiago.) This is a reflection of

two facts: (i) that the work of the investment banks is still at a very preliminary stage; and (ii) the relative lack of entrepreneurial sophistication of the MEDMs of the region.

Access to venture capital through a local facility similar to that of the Vancouver Stock Exchange would facilitate funding of the higher risk enterprises and of exploration activities. Such an instrument would allow entrepreneurs to open specific funds to finance exploration and other high-risk activities; provide access to fresh capital with which local enterprises could address their chronically low investment in exploration; and enable local and foreign professionals to fund exploration projects which might later be sold to interested investors for development and operation. It would contribute to the generation of soundly financed new projects, the high-risk exploration phase of which would be able to proceed without having to use debt; broaden the entrepreneurial base of the MEDM sector; contribute towards the most efficient use of resources; and help create and develop an effective mineral property market.

E-4 MINING ASSETS AND COLLATERAL

As noted in section C.3.2, local commercial banks in the region do not yet accept mineral rights to proven reserves as collateral for loans as they have no wish to enter the mining business. However, available financial instruments or securitization of assets could be used to transfer the unwanted risk to an interested third party. For this, the bank would pay the third party (most likely a competing mining company, a trading company or a construction company) an agreed amount in exchange for their agreement to assume the risk of default. In such event, the third party would have to pay the debt but would end up owning the mineral rights used as guarantee.

E-5 THE ROLE OF THE TRADITIONAL PROVIDERS OF CREDIT

Since subsidized credit as formerly practiced by the Mining Banks should be avoided, it will probably be necessary for multilateral credit institutions to continue to provide long term multisectoral credit lines until such time as the deficiencies of the local banking and financial sectors are rectified. The multilateral credit institutions have been the main source of term credit for the Medium and Small Mines of the region. In Mexico, long-term financing of MEDMs and SMs is funded with a World Bank credit line channeled through the FFM, a remnant of the old Mining Bank, CFM. In Chile, one local commercial bank has established a Mining Department which carries out its own appraisals, but this bank still finances most of its long-term loans to MEDM from an IDB-funded multisectoral credit line.

Meanwhile, reform of the domestic banking sector will be needed to provide short and long term finance at competitive rates and to provide the services required for the development of the mineral sector. This implies liberalization of banking regulations and encouraging competition in the sector to drive down operating costs, while ensuring sound asset management. It also requires the development of long term savings instruments attractive to the local market.

Apart from the banks and commodity traders, local smelters and refineries could be a viable source of funding, especially for the SMs. Enami in Chile, La Oroya in Peru and Vinto in Bolivia, have long been purchasers and processors of the production of MEDMs

and SMs. To maximize supply from these sources is in the interests of these plants. As La Oroya and Vinto are being privatized, the creation of financial subsidiaries to provide working capital at market rates for their suppliers of concentrates would be a sensible step for the new owners to take, without affecting existing relationships between the miners and commercial banks.

E-6 THE MINERAL PROPERTY MARKET

Of major significance to the development of a strong Small and Medium Mining industry is a market in mineral properties. This market is the most effective instrument available to ensure that investors will have open and fair access to the mineral resources of a country on a continued basis. The most important effect that a well functioning mineral property market has on the modernization of Small and Medium mines is that it facilitates entry to the sector of new investors able to play a key role in the restructuring of Small and Medium Mines with strong growth potential. The potential purchasers of mining assets are either producers, investors, agents, entrepreneurs or high-risk speculators. The emergence of mineral property agents, who act as real estate agents and earn their fees by bringing the sellers and purchasers of mining assets together, has facilitated the growth of the thriving mineral property market in Chile.

E-7 INFORMATION AVAILABILITY

The main role of the Geological Survey is to provide the basic geological and geophysical information required by mining companies and planning authorities. This is discussed in detail in the Institutional Chapter (Chapter III) but its importance is emphasized by the South Australian example described above. Countries in the LAC region cannot rely solely on their supposed geological prospectivity and reforming their mining and investment regimes to attract foreign investment into their mining sectors. Exploration techniques have improved by orders of magnitude over the past 25 years. Major discoveries continue to be made in the developed mining countries where there is a large, readily accessible data-base and these countries retain considerable attractions. The sums involved in obtaining this basic information may be large but the returns in terms of new discoveries, increased exploration expenditure and its multiplier effects in the local economy, can more than compensate.

F. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are dependent on the successful implementation of macroeconomic and mining sector reforms to provide a stable environment in which mining of all kinds can prosper. The presence of a strong local industry provides the opportunity for synergistic interaction between local and foreign companies for the mutual prosperity of both, and the nation as a whole. The confidence of foreign and local investors alike that the reforms will be lasting can be expected to take several years to build up.

In the meantime measures need to be taken to alleviate the immediate problems the sector is facing. These are:

1) Lack of equity capital

In the short to medium term, foreign investors are likely to be the major source of risk capital for the Small and Medium Miners. This applies to the larger MEDMs, which will be able to access the international capital markets and to establish joint ventures with international companies and to the smaller mines with attractive deposits which may appeal to foreign juniors for restructuring and expansion. In the longer term, however, there is a need for the development of local capital markets as a source of significant equity capital. The recent activities of merchant banks in the region are an important step in this direction, as is the presence of the AFPs, which could, in due time, become significant investors in the capital markets. Another instrument which could have significant impact is the establishment of domestic venture capital markets to finance the higher risk mining activities.

2) Lack of credit

Available bank credit in the local banks is presently all short term and expensive. As confidence in local economies increases, this can be expected to change but the process could be accelerated by banking sector reform to encourage more competition between banks. Competition should bring lower costs and should encourage long term savings through the offering of more attractive instruments, including those of direct financial intermediation, such as bonds issued by the miners. In the meantime credit will probably continue to have to be made available through multisectoral credit lines from multilateral institutions.

3) Management

Consideration needs to be given to the availability of competent managers and technical staff which implies formal training and providing opportunities for the cross-fertilization of ideas. The presence of foreign investment should considerably strengthen the overall technical-managerial level of the mineral industry of the region. However, the pace of mining development is already placing a strain on the availability of experienced managerial and technical staff in Chile and Peru, both of which have numerous engineering universities. In the non-traditional mining countries the situation is likely to be worse. Development of specific mining engineering and management courses by local universities in cooperation with institutions abroad could be established to fill this need.

4) Encouraging an Entrepreneurial Culture

The nucleus of such a culture already exists in the traditional mining countries and it can be expected to flourish once the existing constraints of lack of risk capital and credit are alleviated.

F-1 MEDIUM MINERS

Generally, the Medium Miners are already taking advantage of the new liberal climate. Many have formed relationships with international mining companies and some are considering raising fresh equity. The best are already well managed and time and exposure to modern techniques, especially in the financial area, can be expected to improve matters further. Once they have consolidated themselves, these enterprises could emphasize: (i) the optimization of their financial strategy through the more extensive use

of the services provided by the merchant banks; (ii) grass roots exploration projects; and (iii) the possibilities present in the development and expansion of small mines, as that is where the expertise of the Medium Miners lies and where they have comparative advantage over the international mining companies.

F-2 SMALL MINERS

The Small Miners face a more difficult situation. In the liberalized environment, those with good orebodies should be able to attract the interest of foreign investors or MEDMs interested in restructuring and expanding the operation. By themselves, the Small Miners will normally face difficulties in raising risk capital and in managing an expansion program as most of them do not have the required management capabilities. Marginal operations are likely to be forced into closure when the next metal price downturn comes. Improving access to capital and credit will help but the SMs in the formal sector should look to the better managed MEDMs as examples of how to proceed. There may be scope for financing the long term secondment of MEDM executives and consultants to the more promising SMs.

F-3 ARTISANAL MINERS

The Artisanal Mining sector is the most problematic. It is generally neglected by government and decried by environmentalists but will not go away. They should be subject to the same laws and regulations, given title to their claims, and made responsible for their activities. Technical and financial help from government departments, NGOs and others, should be targeted on key groups of artisanal miners who have obtained legal title and shown a degree of competence and entrepreneurial spirit. Making the target group successful will encourage other artisanal miners to join the fold, and hopefully in time, to rise the ladder to become Small Miners.

CHAPTER V: ENVIRONMENTAL CONCERN

A. INTRODUCTION

A-1 GENERAL OVERVIEW

This chapter discusses environmental management[7] in the mining industries of the LAC region. The present level of environmental awareness and management capability, the need and urgency for change, and how governments can best go about making the necessary changes, are all covered.

The background situation, described in Section A, sets out the need for environmental reform, outlines how it can be achieved, and presents the general issues involved. These are divided into policy matters, organizational issues, and other related matters which may apply in particular countries.

Secondly, the main issues are discussed in detail in Section B. General policy issues include the need for information and its availability; the role of environmental policy instruments, namely Command and Control Measures and Market Based Incentives, and the degree of urgency for reform, which is acute in some countries of the region. Also discussed are the roles of environmental planning tools such Sectoral Environmental Assessments (SEA), Environmental Impact Statements (EIA), Environmental Audits (EA) and Social Assessments (SA).

One of the most important issues discussed is the "sectoral" versus "integral" approach to environmental management. The report concludes that the integral approach, through an environmental government institution (EGI),which is not tied to a specific sector and which forms part of the overall development planning scheme, is the preferred solution. However in those countries which have yet to develop their EGIs, the sectoral approach, with an environmental office within the Ministry of Mines, provides a practical scheme for the start of environmental work as it provides easy access to technical expertise and a better understanding of the issues involved. Once the basic instruments and procedures are in place, movement towards an integral or mixed approach, where sectoral offices are coordinated by a national central authority, is recommended.

Other organizational issues discussed are the importance of private sector participation in the development of policies, laws and regulations; the functions of environmental institutions; and the role of consultants and technical assistance programs.

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[7] The term "environmental management" includes, for the purposes of this report, social and community related issues.

A key issue in some LAC countries is the privatization of state-owned mining enterprises (SOEs). This raises a number of environmental questions, in particular the need for a strict allocation of responsibility for environmental matters between the old (state) and new (private) owners. How this can best be achieved through Sectoral Environmental Assessments, Environmental Audits, and sales contract terms is described. The chapter also discusses the problems raised by artisanal or informal mining operations and the preferred means of tackling them.

Thirdly, in Section C the present situation regarding the degree of advancement of the different LAC countries in environmental management is analyzed. To simplify matters, the countries have been broadly grouped according to their strengths, capabilities and needs, into four categories:

1. Countries with a developed Environmental Management System (EMS) and substantial national capability;
2. Countries with an EMS in development and substantial national capability;
3. Countries with an EMS in development and limited national capability; and
4. Countries with no or embryonic EMS and varying national capability.

The social issues associated with mining development are covered in a preliminary manner in Section D. This section is based on well recognized general principles but does not benefit from detailed country work in the field.

Finally, Section E covers the needs and priorities of each group of countries.

A-2 THE NEED FOR ENVIRONMENTAL UPGRADING

The protection of nature and sound environmental management are relatively new issues in most countries of the LAC region. The need for community related social awareness has only recently gained prominence. However, environmental awareness is sweeping the world and the mining industry is under particular pressure to adopt sound policies.

Environmental considerations have become obligatory elements in mining ventures and those countries with competent environmental management have an advantage in the attraction of new investment. Progress is being driven largely by the major international mining companies whose actions are under the scrutiny of environmentalists and the international public, and who cannot afford to risk their reputation.

The absence of clear environmental policies will therefore be a disincentive to mining investments. The global trade in minerals facilitates the enforcement of responsible environmental conduct. Furthermore, the international banks and development organizations are demanding rigorous environmental conduct including recognition of the rights of local communities, partly as a matter of principle and partly because of the risks of possible later claims for compensation and clean up. The smaller companies, which depend most on credit and support from such institutions, will therefore be required to execute sounder environmental management.

Serious investors like clear, consistent and realistic environmental policies reflected in workable legislation. Effective public administrations and national regulations regarding environmental permitting are indispensable for proper environmental management since long administrative delays and uncertainties are costly and function as hindrances to foreign investment. Adequate regulations and competent agencies are needed to monitor mining enterprises, to control those who are not behaving responsibly, and to provide detailed rules and standards for all.

A-3 A ROAD MAP FOR THE REFORM

An environmentally sound mining industry is one which exploits mineral resources with maximum economic efficiency without harming human health, damaging local communities or biological diversity while maintaining ecological stability. It is the responsibility of governments to transform this vision into practical action. However, environmental administration of the mineral sector should form part of a wider national environmental management system with established policies, legislation and enforcement procedures.

The main elements of such a system are:

1. Development of an environmental policy, including the establishment of goals and the formulation of strategies for achieving them.
2. Elaboration of a national environmental action plan for all business sectors, promulgation of an "umbrella" environmental law, and enactment of sector specific laws and regulations.
3. Establishment of goals for the environmental quality of different ecosystems, and standards for industrial emissions to the air, effluents to water bodies and solids discharges.
4. Establishment of public institutions responsible for environmental management and law enforcement.
5. Training personnel in environmental management.
6. Maintaining effective public environmental management by promotion of environmental knowledge and information, and the encouragement of public participation in environmental matters.

All these elements have a bearing on the mining industry, although to different degrees and with large differences between countries. The methods employed for achieving the goals will vary considerably and will depend on local, natural, socio-economic and cultural conditions. Different approaches may be taken regarding policy issues, the development and organization of an environmental institutional framework, and other matters. Blueprint solutions should be avoided. Each country should consider the options available and examine the experience of others.

The main issues that an Environmental Management System (EMS) needs to address are:

General Policy Issues

1. Information needs and availability.

2. The role of environmental policy instruments.
3. The degree of urgency for reform.
4. The role of environmental planning tools.

Organizational Issues

5. The sectoral versus integral approach to environmental management.
6. Private sector participation in the development of policies, laws and regulations.
7. Functions of environmental institutions.
8. The use of consultants and technical assistance.

Other Key Issues

9. Privatization of state-owned enterprises (SOEs).
10. Artisanal or informal mining operations.
11. The relationship between occupational health and safety and the protection of the environment.

B. KEY ISSUES

B-1 GENERAL POLICY ISSUES

This section of the report deals primarily with issues which may be referred to as purely environmental. Issues related to the social aspects of mining development are discussed later in this chapter (Section D).

B.1.1 INFORMATION NEEDS AND AVAILABILITY

The introduction of effective environmental management in the mining sector requires large amounts of baseline background data on natural conditions, the situation in areas of previous contamination, and an understanding of the processes involved. This knowledge constitutes the base against which the environmental quality objectives should be set and the effects of present or future mining evaluated[8]. The information base should include the following main elements:

1. Natural background data: geological, hydrological/climatological, biological/ecological, etc.;

2. Contamination data: contamination of soils, natural waters, air, etc.;

3. Definition of sources of contamination: e.g., discharges from mining operations, leaching from old waste, smelter emissions, etc.;

4. Definition of transport mechanisms; and

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[8] Annex 3, which discusses basic geologic infrastructure, includes a section on environmental base line information.

5. Pollution impact: the impact of pollution on flora, fauna, and human beings.

Even in industrialized countries, knowledge of natural conditions and processes is often insufficient for optimal environmental management. In the LAC region, information regarding baseline conditions is limited, and extremely scarce in some countries. There is an urgent need for resources and foreign expertise to develop local research capabilities and to obtain national and regional environmental data.

In many countries the use of scarce water resources is a real or potential issue of conflict. In such circumstances, assets and consumption priorities should be established. Baseline data should also be used to compile lists and maps defining protected areas, currently effective or proposed and environmentally sensitive areas.

Little is known about natural background levels and the consequences of mining pollution in the region but the influence of mining operations is often obvious. In many cases it can be established that mining related emissions affect farming and fishing. Lack of information may cause harm in several ways: the setting of unrealistic objectives; insufficient control leading to environmental deterioration; poor design of control measures causing costly and ineffective protection; and unnecessarily strict rules serving as a disincentive to development.

B.1.2 ENVIRONMENTAL POLICY INSTRUMENTS

The definition of goals in the form of environmental quality standards in the region is still in its very early stages. Most LAC countries still do not have standards in place. For example, few know their water resources (groundwater and surface water) or have established ambient water quality standards. Furthermore, where such quality standards exist, they are usually general sets of values adopted from the World Health Organization (WHO) or other foreign recommendations without much adaptation to local circumstances. These values can serve as a first approximation but need to be elaborated as more national background information becomes available. Many LAC countries have a number of diverse ecosystems within their borders and it would often be appropriate to set different environmental goals for different regions. It is important that such goals are established and that the consequences of mining are part of such considerations.

The instruments used for environmental control are commonly divided into two groups: command-and-control measures and market-based incentives.

Command-and-control measures are regulatory in nature and constitute the base for environmental management everywhere. They include concentration-based, mass-based (e.g., norms regarding maximum amounts of contamination in water discharges and air emissions), and technology-based (technical directions, which are sometimes based on the concept of best available technology (BAT)) standards. The BAT concept is one of choosing the best available technology based on environmental criteria while still being economically feasible.

Command-and-control measures, usually in the simple form of restricting the content of a given pollutant in discharges, are the dominant strategy in the LAC countries. In most,

this type of regulation seems to be the only form of directive considered. There is no consideration of standards based on such factors as the character and capacity of the receiving ecosystem to tolerate the amounts of discharged material (as opposed to the concentration in solution or suspension), or the cost of achieving the standards. However, in major mining countries the application of recipient standards (e.g., setting maximum concentrations in the receiving water) is being considered as a way of more realistically following the local environment's capacity to tolerate discharges.

Market-based incentives in contrast, aim to achieve sound environmental behavior by market mechanisms (charges, taxes, subsidies, etc.) and are used in a complementary manner to command-and-control measures in some cases. For example, Mexico is charging substantially for the use of water in dry areas. This provides an incentive to reduce groundwater pumping and increase the recirculation of process water. In Argentina and Bolivia there are tax incentives for investments in environmental improvements.

Pollution abatement funds for the mitigation of pollution stocks from earlier operations do not yet exist in the LAC countries. However such funds, financed for example by levies on industrial discharges, should be considered as a means of introducing market mechanisms in environmental management and establishing funds for mitigation.

As an approach to basic regulation, distinct discharge standards have the advantage of being readily understandable and realistic to many mining companies, especially those with international experience. They also allow the authorities to control compliance by simple monitoring and chemical analysis. However, medium and small companies do not always possess the experience and competence in environmental control and management. For these groups, the more concrete strategy of focusing on technology and practical environmental management is deemed more efficient, especially in countries where the authorities' competence in mining matters is limited.

Countries of low relative development with little or no environmental regulations in place, should begin by making policy statements and introducing general guidelines ("soft law"). These can be augmented later by the introduction of basic discharge standards in combination with technology norms and recommendations. The same is valid for the more advanced countries, albeit starting from a more sophisticated level. During the period of preparation and introduction of the initial legislation, which may take two or more years, the use of Codes of Practice may serve well as general guidance.

B.1.3 THE DEGREE OF URGENCY FOR REFORM

Time is a factor in environmental management in at least two ways: the timing of introduction and enforcement of legislation; and the time periods required for environmental studies and permitting. Both are of importance to the regulatory entities and to the mining companies. While all countries should initiate or continue their plans for environmental regulation, different circumstances in different countries could make it advisable to follow different strategies regarding the pace of environmental reform.

The development and introduction of environmental policies and legislation should ideally allow for ample consultation with all involved parties, but the pace of development must also consider the requirements of investors. They need clear and permanent guidelines in the early stages of a project's development. A balance must therefore be struck between the desire to rapidly introduce environmental measures and the more long-term requirement that regulations be consistent, well adapted to their purpose, cost-effective, and that they do not unnecessarily delay development.

A measured approach allowing ample time for consultation may be realistic in countries where mineral developments are few and modest, but in those where mining is extensive, the present pace of development is generating considerable pressure for a rapid establishment of governmental environmental regulation and supervision. Investors and lending institutions want to know the "rules of the game" now, and require them to be clear, reasonably complete, and permanent for a foreseeable future. In these countries (e.g., Peru) developing a national environmental system over an extended period of successive achievements is not an option and the need for speed will obviously necessitate some compromises, primarily through the adoption of "ready-made" elements from established foreign systems.

The rules for rehabilitation of existing environmentally sub-standard operations are as important as those for new mineral developments. As examples, Mexico and Peru allow five years for the upgrading of old mining operations to modern environmental standards, and policy in Chile calls for "gradualism and realism". This appears reasonable and realistic provided environmental audits are carried out and plans for successive measures established and enforced.

B.1.4 THE ROLE OF ENVIRONMENTAL PLANNING TOOLS

Environmental planning and management can be aided by:

1. Sectoral Environmental Assessments (SEA). These are overall studies on the environmental effects of previous and present mining and are used as a planning tool on a national or regional level.

2. Environmental Impact Assessments (EIA). These are legal instruments for introducing environmental planning and control into company management at the feasibility stage of mining ventures.

3. Environmental Audits (EA). These are used for evaluations of on-going operations, either as a legal requirement and controlled by the authorities, or as a voluntary management tool within the companies.

Sectoral Environmental Assessments are effective regional and sectoral planning instruments and serve two main purposes: establishing basic knowledge; providing an overall view of the environmental issues in the sector; and setting priorities. For example, which mining areas should be given most attention and which environmental problems are critical.

The setting of priorities should be based on urgency (risks to human health, etc.), feasibility (including potential effectiveness of measures), and costs. Annex 8 shows the Table of Contents of a country-wide SEA recently conducted in Bolivia within a World Bank program.

It may often be useful to carry out a special sectoral social assessment in order to: (a) achieve a better understanding of the social and cultural contexts of mining activities in a given district, (b) to determine its social impacts and (c) to develop action plans that enhance benefits and reduce adverse effects on the population. This is further discussed in Section D.

Environmental Impact Assessments for environmental planning and control of new projects are already well established in the majority of the countries of the region. The concept is incorporated in the legislation of most countries as a prerequisite for new ventures. Mexico and Peru are even developing special guidelines for the execution of EIAs within the mining sector, and instructions on how the authorities should examine and judge such studies. However, many LAC countries do not have a viable scheme for making effective use of EIAs in mining projects. Immediate measures to partly remedy this situation should include assistance for the elaboration of EIA instructions and training of personnel.

As an instrument for the mitigation of ongoing operations, Peru is introducing the Environmental Management Program (PAMA) which requires mining companies to make environmental audits of their operations, to propose plans for successive improvements to meet regulatory standards within the legally required timetable and, after approval of the plan, to carry it out and report results regularly. Although still in its infancy, this scheme has promise and could serve as a model for other countries in the region. Similarly, Chile has a planning instrument for reducing contamination in already heavily polluted areas (so-called saturated areas). This scheme is aimed primarily at controlling gas emissions and focuses on all smelters within each geographical region.

The evaluation of the extent and character of environmental liabilities from old operations, so-called "pollution stocks", is done through the execution of environmental site audits. These are used to calculate remediation costs and assign responsibilities and priorities. They are preceded or complemented by SEAs to set overall priorities across sites.

The responsibility for past sins is seldom clearly defined but in Chile the new environmental law explicitly states that there is no retroactive responsibility in environmental matters. As the greater part of pollution stocks in the LAC region are within state-owned companies (e.g., in Bolivia, Chile, and Peru), the state within the respective countries is bound to be held responsible for most of the clean-up.

A discussion of environmental issues in the privatization process is presented in Section B.3.1. Annex 9 shows the Table of Contents of an environmental audit.

SEAs carried out in cooperation with foreign experts provide good opportunities for technology transfer to local professionals. In addition, the use of EIAs for new mining

enterprises, and EAs for ongoing or previous operations are highly recommended procedures for environmental management of local activities. If well designed and employed, these instruments should help significantly in introducing effective environmental management into the mining sector.

B-2 ORGANIZATIONAL ISSUES

B.2.1 THE SECTORAL VERSUS INTEGRAL APPROACH

This is a key issue to be decided in national environmental management. Environmental legislation and enforcement institutions common to all economic sectors (the integral approach) should provide comprehensive solutions to environmental issues. In practice however, this approach has sometimes resulted in unworkable laws and regulations to the detriment of mining development and environmental supervision. The alternative of sectoral regulation suffers from the inherent weakness of conflicting interests between mining development and environmental control. There is therefore a risk of noncompliance and inappropriate leniency. However, the mining sector and environmental agencies should be viewed as complements rather than antagonists or alternates in attempts to improve environmental quality.

Environmental supervision of the mining sector in the LAC region is carried out either by a central environmental agency (Mexico, Venezuela), a number of sectoral and regional institutions coordinated by a central environmental agency (Chile), or a ministry/secretariat of mining (Peru). In Argentina supervision is the exclusive responsibility of provincial agencies, usually a local secretariat.

A central environmental agency can work satisfactorily (Chile) but in many countries functions less well due to bureaucracy, shortage of technical expertise, and the lack of contact with and understanding of, the mining business. This makes permitting and control slow and inferior.

On the other hand, leaving environmental responsibility with a ministry of mining implies a risk of lax control due to the inherent conflict of interest. However, given that the administration of environmental matters is totally distinct from other issues within a ministry of mining, the sectoral approach would probably be acceptable and preferable as an initial step in those countries with weak environmental institutional capability. It provides easy access to technical expertise, better understanding of the issues involved, and leads to superior coordination between technical and environmental permitting.

However, a sectoral initiative needs to be viewed as a temporary solution and complemented with a program to strengthen the central environmental agency. As soon as competence and maturity in environmental matters evolve, responsibility for supervision and control should be taken over by the central agency. Even if the mining entity takes the lead initially, joint efforts are desirable and strengthening of the overall environmental agency is necessary. In this way the central environmental agency will become capable of assuming full responsibilities.

Box V.1: Sectoral Versus Integral Approach to Mining Environmental Management

The Integral Approach

There is a consensus among environmental planners and economists that in an ideal world an effective environmental management system for a country has the following features.

> There should be an environmental government institution (EGI) not tied to any particular ministry, which should act as a forum for environmental concerns. It should have a technically and managerially competent, multi-disciplinary staff able to address problems from a cross-sectoral perspective, and arrive at decisions in a transparent and impartial way. The function of the EGI must also include being part of development planning, as by being part of the planning process it can take a preventive approach to environmental problems.

The Sectoral Approach

The ideal situation is rarely found in the LAC region. Administrations based on the above principles have proven to date to be deficient and bureaucratic in their management of the mining sector. The most viable solution for countries which are new to environmental reform and have limited expertise and administrative capability is therefore to initially grant mining environmental supervision to the respective mining authority, while the EGI undergoes a strengthening program to enable it to assume responsibility at the national level. This is especially the case in countries where competent environmental managers are scarce and the sector authority has some competent professionals already.

This approach facilitates the securing of the necessary technical expertise and administrative framework and has shown better results in the early stages of environmental reform, e.g. Peru, and should be considered by countries in a similar position, e.g. Argentina and Bolivia. Once a critical mass of information and knowledge is available, the integration of the sectors and the structuring of a mixed approach, where sectoral and regional entities are coordinated by a central agency, as in Chile, would result in a well rounded scheme of environmental management.

B.2.2 PRIVATE SECTOR PARTICIPATION

The broadest possible consensus should be sought in establishing environmental policies, laws, and regulations for the mining sector. This means consultation and coordination between the relevant agencies, the mining sector, and representatives of potential competitors in the use of land and resources (farming, forestry etc.). The engagement of the public in the formulation of legislation and guidelines is also important.

It must be emphasized that the lack of adequate consultations can result in the establishment of unworkable legislation, as was initially the case in Mexico and Peru.

The participation of the private mining sector in the environmental reform process is desirable because of the collective expertise available within the mining companies, at least for mines, concentrators, smelters, and waste disposal impoundments. Furthermore, the involvement of industry representatives should create an open atmosphere in reaching sound and workable proposals. Elaborating legislation and instructions will always

involve consideration of technical, economic and other factors, and the decisions reached must represent a balance between different goals and aspirations. Balances can only be struck after intimate consultation and negotiation, and the participation of all interested parties can only benefit the process and the results. A major potential achievement is also the inherent commitment by the industry to honoring the results of such an exercise.

The participation of major international mining enterprises could strengthen considerably the process of environmental upgrading. These companies have realized the importance of having long-term internationally acceptable environmental rules and understand their self-interest in taking part in the regulatory process. Their participation would therefore bring credibility to the process of environmental reform.

Besides the involvement of industry, it is of utmost importance that all other relevant stakeholders (including NGOs and community organizations) are systematically involved in the consultation and consensus building activities.

B.2.3 FUNCTIONS OF ENVIRONMENTAL INSTITUTIONS

Experience shows that the main difficulty in achieving a successful environmental management system lies in the implementation and enforcement of regulatory measures. An efficient administration can only be achieved with good human resources backed by appropriate funding and infrastructure. There is widespread concern that public environmental management will become bureaucratic and cause undue and costly time delays. In some countries permits may be delayed for years. Chile has acknowledged this risk and has established maximum periods for examination of applications. In Chile, if no decision is received within the stipulated period, applications are automatically approved. However, this is less than optimal for both parties as even the applicant may feel uneasy about his rights and long-term responsibilities under such a "permission".

Another concern is the procedures relating to such relatively inoffensive environmental activities as mineral prospecting and exploration. For example, Chile and Venezuela require an application and a permit for each prospect but Peru is following most industrialized countries by issuing only instructions and guidelines for such activities.

B.2.4 TECHNICAL ASSISTANCE AND USE OF CONSULTANTS

Given the weakness of state agencies in most LAC countries, there is a risk that qualified environmental management will take a long time to implement. Hence, Technical Assistance (TA) programs to strengthen the regulatory agencies, and ensure the quality of their output are important. TA programs can include:

1. Education and training within the regulatory agencies;
2. The identification of local environmental consultants, their training, and possible certification; and
3. The promotion of environmental work within the mining associations and their member companies.

Qualified and experienced consultants exist to varying degrees in Argentina, Bolivia, Chile, Ecuador, Mexico, Peru, Venezuela and other countries of the region and they

frequently form alliances with foreign consultants. The concept of employing consultants for environmental supervision has gone farthest in Peru where consultants accredited by the government carry out practically all monitoring and control on behalf of the responsible government agency (The Dirección General de Asuntos Ambientales/ Ministerio de Energía y Minas).

Under this scheme, it is the obligation of each mining company to have monitoring and control carried out according to governmental stipulations by a professional consultant, and to pay for his services. A small group within the ministry of mining is responsible for the overall management, permitting, and accreditation of consultants. Although still in its infancy, this strategy could be a model for countries with limited technical and financial resources.

B-3 OTHER KEY ISSUES

B.3.1 PRIVATIZATION OF STATE-OWNED ENTERPRISES (SOE)

Many of the mines and plants of the SOEs in the LAC region are being privatized or offered in joint ventures. These include some of the environmentally most troubled operations, such as those of Comibol in Bolivia and Centromin in Peru. SOEs are generally less well environmentally managed than private companies due to having old mines with obsolete technology, poor economic fundamentals, political protection against demands from environmental authorities or the public, and little exposure to international pressure and stimuli.

Environmental issues in old mining areas can be complex and it is important that the division of obligations between old and new owners of mining SOEs be well defined and agreed upon. Detailed environmental audits are required to form the basis of negotiations and agreements with private partners. These audits will define the division of responsibilities for environmental liabilities between the SOE, the new private partner, and the state. While the exact distribution of obligations will depend on negotiations between the parties, in principle the state will have to bear the burden of past activities while the new partner assumes responsibility for future environmental management of the operation.

To avoid post-privatization problems the contract should stipulate:

1. The obligation of the new owner to respect any existing or future national environmental legislation;
2. The identification of environmental problems from past mining operations, the specification of necessary remediation measures, and the acknowledgment of both parties of the present status as described in the audit documents;
3. The new owner's commitments regarding remediation measures to be undertaken;
4. The state's possible role and commitments in remedying historic environmental liabilities;
5. Agreement on all financial and managerial commitments in various environmental matters; and
6. An agreed timetable of actions with assigned responsibilities.

B.3.2 INFORMAL MINING

Informal mining is often carried out without any rights to minerals or land by small groups or loose associations of individuals. In several LAC countries the number of informal miners can be counted in tens of thousands while in others such activities are very limited. The major part of this informal mining is carried out in remote jungle areas beyond the power of the authorities where there is neither environmental control nor any supervision of occupational health and safety. Artisanal mining is primarily a subsistence activity driven by poverty and the lack of alternative employment, and the substantial environmental destruction caused has little economic justification. However, these activities can usually not be stopped and will often have to be tolerated for social reasons.

Broadly speaking, the informal sector can be divided into alluvial and hard rock mining. The exploitation of gold from weathered rocks in tropical areas represents a transition between the two.

Alluvial gold operations and the related gold extraction from hard rock are associated with soil erosion, silting of rivers, de-vegetation and contamination of nature with mercury. Mercury is also a major health concern to the workers themselves. Hard rock mining is connected with the production of solid waste, acid water and heavy metal contaminations. Small groups of miners excavating more or less at random also results in underground work being extremely hazardous and unhealthy.

Little has been done in the surveyed LAC countries to mitigate the environmental effects of informal mining, although Venezuela has tried control with some success. CVG has licensed and provided training to about 300 small groups of miners and built two gravity treatment and amalgamation plants as a service to the miners. It is claimed that the uncontrolled use of mercury has decreased substantially and that only 35% of Venezuela's present gold production originates from the use of crude amalgamation methods.

Solving the environmental and social problems associated with informal mining should focus on alleviating the worst aspects of the situation without subsidizing or otherwise prolonging uneconomic operations. Measures for reducing the negative environmental effects should include the legalization of activities by granting fully tradable mining titles, providing training and technical advice and services, and monitoring adherence to laws and regulations. The objective should be to attain stable and long-term activities with better utilization of natural resources, and to limit environmental impacts. The possibility of tangible achievements, at least in the less remote areas, should be reasonably good.

B.3.3 OCCUPATIONAL HEALTH AND SAFETY

In the field of occupational health and safety, many LAC countries need modernization of antiquated legislation, institutional strengthening, and the education and training of personnel.

Occupational health and safety can be considered labor or internal environmental issues as opposed to external environmental questions which concern the relationship between companies and their surroundings. There is a tendency for local authorities in the LAC

region to give less attention to occupational health and safety since influence from abroad is almost entirely focused on management of the external environment. This is unfortunate because deficiencies in the working environment adversely affect the quality of life of workers; and workers are unlikely to care for the external environment if their own working conditions remain poor.

Separate laws usually govern the workplace and the external environment and different authorities are responsible for supervision. However, there are circumstances where the dividing line between the two is less clear, both legally and managerially. For example, employees may be exposed to contaminants at work and also be affected through living in mining towns or camps, by the same emissions crossing the plant boundary.

A common characteristic of the treatment of the two fields in the LAC countries is that the EIA of a new plant or mine mostly concentrates on the external environment, while health and safety are dealt with in a summary way. This should be changed so that health and safety are also covered in the planning stage.

The laws and regulations dealing with occupational health and safety within the mining sector are, in most countries, common to the whole industrial sector but include special regulations addressing the particular conditions of mining. Underground operations are usually a main concern in the sector-specific regulations.

C. ENVIRONMENTAL MANAGEMENT IN THE LAC COUNTRIES

Environmental performance within the mining sector of the LAC countries varies immensely and there is considerable scope for improvement by all. Some countries have had their legislation in place for a decade or more while others are only now introducing laws and regulations. One factor accounting for the great variation is the extent and standard of higher education in a particular country.

In an effort to group countries with similar characteristics the following factors have been chosen and evaluated.

1. General environmental awareness among the public as expressed, for example, by environmental matters getting coverage in the press and the activities of environmental action groups (NGOs).
2. Existence of a legal and regulatory environmental framework.
3. Availability of national basic environmental data and information, as published by governmental organizations or universities.
4. Existence of a functioning civil service and environmental agencies.
5. Efficiency in public environmental management.
6. Overall human resource development within the field of environment.
7. Degree of urgency required for introducing or increasing environmental legislation and public management in the mining sector.
8. Extent and environmental impact of artisanal and small scale mining.

The importance of each of these factors in the different countries surveyed has been evaluated in a relative manner and categorized as "low", "moderate" or "high". Although the ratings are only rough approximations, a pattern is revealed which enables the countries to be broadly grouped into four different categories (see Table V.1). It can be seen that the prevalence of informal mining has little bearing on the country's overall environmental performance.

Table V.1: Environmental Profiles of Selected Countries

	Mexico	Venezuela	Chile	Bolivia	Peru	Argentina	Ecuador	Panama
GROUP	**1**		**2**	**3**		**4**		
A Environmental Awareness	●	●	⊖	○	○	○	○	○
B Legal Framework	●	●	⊖	○	⊖	○	○	○
C Baseline Information	●	⊖	●	⊖	⊖	○	○	○
D Administrative Build-up	●	●	⊖	○	⊖	○	○	○
E Efficiency in Management	⊖	○	●	○	⊖	○	○	○
F Human Resources Development	●	⊖	●	○	⊖	●	○	○
G Urgency for Environmental Development	●	⊖	●	●	●	⊖	○	○
H Informal Mining	○	●	⊖	●	●	○	●	⊖
Relative degree of achievement or importance								
○ **Low**			⊖ **Moderate**			● **High**		

The four groups, identified above, can also be classified in terms of existing conditions and resources for national environmental development. In this case they would be subdivided in accordance with the following combinations of the factors listed above:

1. Existence of a public environmental management system (EMS); (factors B, D and E);
2. Existing national knowledge and expertise; (factors A, C, and F);
3. Urgency of action required for developments or reform; (factor G); and
4. The approach chosen for environmental management: sectoral, integral, or mixed

Table V.2: Profiles of the Four Country Groups

1. (Mexico, Venezuela)	**Low**	**Medium**	**High**
Existing public environmental management	==========		
National knowledge and expertise	==========		
Urgency of actions	==========		
Approach	**INTEGRAL**		
2. (Chile)			
Existing public environmental management	==========		
National knowledge and expertise	==========		
Urgency of actions	==========		
Approach	**MIXED**		
3. (Bolivia, Peru)			
Existing public environmental management	==========		
National knowledge and expertise	==========		
Urgency of actions	==========		
Approach	**SECTORAL**[9]		
4. (Argentina, Ecuador, Panama)			
Existing public environmental management	==========		
National knowledge and expertise	==========		
Urgency of actions	==========		
Approach	**UNDECIDED**		

As seen from the above chart, each of the four groups has its own characteristic profile which could be briefly described as:

Group 1. Countries with developed EMS and substantial national capability.

Group 2. Countries with EMS in development and substantial national capability.

Group 3. Countries with EMS in development and limited national capability.

Group 4. Countries with no or embryonic EMS and varying national capability.

The organizational approach chosen for environmental supervision, sectoral or integral, reflects history and current urgent needs. Group 1 includes countries which developed legislation and environmental management many years ago and opted, as in most other countries at that time, for an integrated system for all sectors.

[9] While Peru has undertaken a sectoral approach, Bolivia has (after the termination of this evaluation) formally opted for an integral approach but has made very limited progress in the implementation of its environmental institutions. It is probable that a sectoral approach or a joint effort between the environmental agency and the mining authorities would have given a more rapid advancement.

The Group 2 country, Chile, is well placed to develop a more sophisticated and complete environmental management system in line with common practice in the industrialized and Group 1 countries, but with some responsibilities given to the sector authorities.

In contrast, Group 3 countries had until recently very little legislation and public environmental supervision installed. Due to the urgent need for regulation during the mining rush and privatization efforts of the last few years, particularly in Peru, a sectoral approach was chosen for the initial phase.

The route to be taken by the Group 4 countries is still unclear but most seem to be heading for a sectoral approach

D. SOCIAL ISSUES

In addition to the purely environmental matters discussed above, the impact of mining on the local community is of increasing concern to governments, mine operators and agencies associated with mine development. Mining operations, whether already closed, currently operational or at the planning stage, have the potential to severely impact local communities. These impacts are not attributable solely to formal mining operations but also to the largely unregulated informal mining which is widespread in Latin America. Major issues relate to:

- induced development adjacent to the mine site;
- distribution of benefits between government, mine owners and local communities; and
- loss of land and/or access to resources on such land by indigenous peoples.

A comprehensive analysis of the impact of the project on the local community is required in order to address these issues adequately. This can be done by completing a social assessment (SA) for the project which takes into account the interests of all the stakeholders thereby increasing the social benefits and minimizing the adverse impacts of the mining activities on the community. The results of the SA provide the basis on which to move forward with project planning, implementation and, ultimately, operation.

However it is important to note that the use of SA in project planning and implementation is at an early stage with regard to both knowledge and practice. An outline of the main topics to be addressed in a Social Assessment (SA) are presented in Annex 10.

D-1 THE MAIN ISSUES

The main issues can be discussed under the three broad categories.

D.1.1 INDUCED DEVELOPMENT

The communities that spring up around mining sites present a broad range of social problems. They include:

- *Unplanned communities* with inadequate infrastructure and funding to provide basic services such as sanitation, health care, schooling, policing, etc.
- *Income inequality* where employees of the mine and those directly associated with the mine have significantly more income than others. This can cause sudden rises in the cost of living, the breakdown of family values and associated problems.
- *Massive unemployment* resulting from the influx of job seekers and migrants with unrealistic expectations of mine associated employment. This situation frequently leads to a general atmosphere of lawlessness with high crime rates and the spread of sexually transmitted diseases.

D.1.2 DISTRIBUTION OF BENEFITS

It is of paramount importance that local communities share in the benefits that accrue from an environmentally and socially sustainable mining project. The reality in the past has often been that the only beneficiaries have been the mine owner/operator, the directly employed and the central government. Even in cases where some provision has been made to integrate the local community into the project the perception has remained that damage from the mine has exceeded the benefits. Mine owners/operators have frequently neglected to integrate the local community into the planning process even at the minimal level of keeping them fully informed of the likely impacts of the project. Education of the public regarding real and perceived damages is an essential component of the relationship between the operator and the local community. For example water may be discolored but safe while timetables for land reclamation remain indefinite or confidential. Explanation to the local community of benefits derived from the mine is important and it is becoming increasingly common for a percentage of tax receipts from the mine to flow directly to the local community.

D.1.3 INDIGENOUS PEOPLES

Indigenous peoples and other vulnerable minorities living in and around a mining area are of particular concern. Mining development should take into consideration:

- *Ancestral rights* such as burial grounds, sacred groves, community pasture, forest, and water bodies used for livelihood and customary practices.
- *Cultural property* such as archaeological, paleontological, historical, religious, and unique natural sites.
- *Language* which is another aspect of social diversity which has implications for participation and project design.
- *Resettlement* of indigenous peoples either voluntarily or otherwise which may be a key issue in mine development.

Annex 11 outlines the main topics for consideration in planning for indigenous peoples.

Those responsible for sustainable mining operations should use social assessment (SA) to identify and target poor and disadvantaged groups and at the local level; to identify, and mitigate, social impacts and risks; to listen to stakeholders and build commitments and ownership; to strengthen capacity of communities, public sector institutions and civil society; to obtain regional and/or country knowledge; and to understand the preconditions for economic and social development.

The completion of this comprehensive analysis of the potential social impact of a mining project provides a basis for all the stakeholders - government, mine owners/operators and the local community - to develop an action plan which will minimize any negative social impact and enable the local community to share in the benefits of mineral development.

D-2 CURRENT STATUS

Historically most large and some medium mining operations in LAC provided social infrastructure for their direct employees. Among large operations, examples of this include the mining communities of Carajas (Brazil), Cerro Matoso (Colombia), Chuquicamata and El Teniente (Chile), Peñoles (Mexico) and Cerro de Pasco (Peru). Medium sized mines such as Arcata, Buenaventura, and Milpo, all in Peru, provided comparable benefits to the local communities. Typically the mining company provided housing, water and electricity, public health services, schools and roads.

However in the past formal mining often ignored its impact on indigenous peoples and pre-existing local communities with the result that often the indigenous people are relegated to the bottom of the social ladder. Another frequent consequence of mining activities, even where the mining company has provided some social infrastructure, has been the development of unplanned satellite towns with the need for the local authority to provide social infrastructure for which it had no source of funding. In some cases the mine operator has taken on the additional burden of providing a minimum of services to these satellite towns but such actions clearly exceed the reasonable obligations of any mine operator. These towns often have inadequate waste disposal, both solid and liquid, with the subsequent implications for health, livelihoods and cultural property. In addition the large income disparity between those associated with the mine and the others often resulted in social unrest within a generally lawless society.

These poor conditions were frequently compounded by the impact of poor environmental practices. Water sources were polluted by both chemicals and particulates (often arsenic, cadmium, and lead) while old solid waste piles (mine waste and tailings dumps) contributed to airborne dust pollution. This type of impact is commonly found in the Andean areas of Bolivia and Peru.

Informal mining has produced very similar problems associated with boom towns and pollution, in this case usually from mercury used to recover gold, with the significant difference that informal mining tends to be of a transient nature as the miners migrate from one "hot" area to another. They leave behind an area where the local community is destroyed and the land polluted. This has been a common occurrence in the Amazon region of Brazil.

D-3 THE ACTION PLAN

It is clear that in the future greater attention should be paid to the impact of mining operations on the local communities. Governments should develop a strategy to ensure that local communities are fully involved in any decisions relating to mine development or operation which impact that community either directly or indirectly.

The completion of a comprehensive SA provides a framework for incorporating participation and social analysis into project design. SAs carried out in the project context will have: (a) identified key stakeholders and established an appropriate framework for their participation in project selection, design, implementation, monitoring and evaluation; (b) ensured that project objectives and incentives for change are acceptable to the people intended to benefit and that gender, ethnicity and other social differences have been taken into account in project design; (c) assessed the social impact of investment projects, and, where adverse impacts have been identified, determined how they can be avoided, minimized or substantially mitigated; and (d) increased the capacity of the local community to participate in resolution of conflicts, delivery of services and the implementation of mitigation measures in ways that are socially sound.

The SA will enable Governments and mine operators/owners to define the priorities that require further attention and resources. Issues of lesser importance are set aside as priorities emerge. It may be useful as a part of priority setting for Action Plan development to consider guiding questions such as the following:

- What is the magnitude of impact? While there is no absolute definition of "large" or "small," gathering information about the number of people or the size of geographic area affected provides a useful perspective that focuses attention on impacts of the greatest magnitude.

- Are there equity implications? Regardless of the magnitude of impacts, special attention should be given to the effects of mining operations on disadvantaged populations such as indigenous peoples, women, and the poor. Projects with disproportionate harm to these groups should be reconsidered and subjected to proactive mitigation or fundamental redesign.

- Are there adverse impacts that are difficult to mitigate? Some issues identified through public involvement may be resolved by modifying the project plan, while others may be almost impossible to mitigate. Where mitigation is difficult, for example, in reestablishing the incomes of traditional cultivators, again, it may be necessary to reconsider project design. Project resources may be needed to support mitigation strategies.

- Are there serious social risks that threaten implementation or project success? All stakeholders in the mining operations have a responsibility to identify social issues or conflicts that may lead to project failure

The ultimate objective of SA is to create an ongoing process that is responsive to new information. While early phases of SA are geared toward understanding the social context within which the project will operate, social assessment during project development also means creating a new social context that includes new activities institutional arrangements. Information and ideas from SA provide inputs for creative, pro-active "invention" of socially appropriate plans.

As the project plan evolves, new opportunities for stakeholder participation project design and implementation may emerge. In addition, this is a critical opportunity for clarifying and cementing the commitment of the Government and any other stakeholders with responsibility for arrangements for implementation and for defining strategies to best address stakeholder concerns. These arrangements become the basis for avoiding conflict and maintaining commitment. At the same time, it is likely that some issues will not be fully resolved during project preparation, and that new issues will arise during implementation, so the project plan should describe an ongoing process for monitoring social issues.

As the use of the SA becomes routine in mining projects the relative roles of the different stakeholders will become clearer. At the present time there appears to be little or no legal framework in place concerning the obligations of mine operators/owners with respect to the local community. This is much as it was for environmental requirements until recently. While it is difficult to define standards for an SA it is becoming increasingly clear that governments have a responsibility to ensure that local communities participate in an equitable manner in mining projects. Many lenders, in particular the multi-laterals, are now requiring a satisfactory community action plan as a pre-condition for project financing.

E. CONCLUSIONS AND RECOMMENDATIONS

In general, the present status of environmental performance in the LAC countries needs improvement and few of the goals have been attained. There are large differences between countries. Although blueprint solutions should be avoided, the following are general guidelines regarding some of the most critical deficiencies and possible corrective measures.[10]

The ultimate goal in establishing public environmental management should be to create capable environmental entities that are independent of sectoral bias. Therefore the strengthening of an overall environmental agency to attain the necessary capability to assume supreme control should be given high priority. However, on the road to achieve this, it may sometimes be efficient and meaningful to rely on sectoral environmental management or a joint effort between an environmental agency and a mining authority.

The general lack of environmental baseline information is a problem throughout the LAC region. The necessary research work to remedy this situation should be given priority in all countries.

A basic operational remediation measure common to all groups is that of pollution prevention, in which the industry itself, due to its detailed knowledge about the industrial processes in use, should play a leading role.

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[10] The "Conclusions and Recommendations" apply principally to the purely environmental aspects of mining as work on the Social Issues is incomplete.

E-1 AGENDA FOR GROUP 1 - DEVELOPED EMS/SUBSTANTIAL CAPABILITY

The main task in these environmentally comparatively well-developed countries is to revise and complement the legal system and to reform an inefficient administration whose competence in dealing with mining sectoral issues is limited. The agenda should consider the following priorities:

1. Priority: Review mining environmental regulations.

Solution/Implementation: Revision of the existing legal system should be carried out to make it consistent and relevant to mining operations. The work should be carried out in close cooperation with state agencies and other affected parties, including representatives of the private mining sector. Consultation should also take place with Non-Governmental Organizations (NGO) and the public.

2. Priority: Revision of administrative requirements and procedures in the permitting process to ensure their efficiency and adapt them to the needs of the mining sector.

Solution/Implementation: These tasks are akin to those above and should likewise be executed in close consultation with the mining industry and concerned organizations. For EIAs and similar management instruments, it is essential that instructions covering their use, execution and evaluation by the authorities, are clear in scope, relevant in their details, and well-balanced in their requirements.

3. Priority: Strengthening and streamlining the abilities of key institutions, particularly the environmental agencies.

Solution/Implementation: The entities should be restructured and often downsized for better efficiency, and regional offices established in the main mining areas. The professional level of staff must be raised and the lack of technical expertise, especially in mining, alleviated. Technical personnel with education and practical experience in mining should be recruited and relations with the mining authorities strengthened in order to achieve better coordination in permitting and control, and to acquire expertise in mining methods and processes.

E-2 AGENDA FOR GROUP 2 - EMS IN DEVELOPMENT/SUBSTANTIAL CAPABILITY

This group is represented by one single country, Chile, which has a vigorous mining industry, well defined plans to introduce environmental regulations and management, and sufficient local environmental expertise. The agenda includes:

1. Priority: Participation of the private sector in the legislation process.

Solution/Implementation: The involvement of the mining industry in the formulation of environmental goals, laws, and regulations will guarantee the contribution of appropriate expertise in technical and managerial matters, and enable a constructive balance to be struck between exploitation interests and aspirations for nature conservation. The process

in itself would be excellent training for all parties involved and would also effectively result in a commitment by the industry to honor the results.

2. Priority: Environmental improvements and rehabilitation within the state-owned mining industry.

Solution/Implementation: A credible environmental policy cannot in the long run have different standards for private and state enterprises. Further progress is needed as in spite of substantial recent improvements, the state-owned mining enterprises are not up to the environmental standards of most of the private mining industry.

E-3 AGENDA FOR GROUP 3 - EMS IN DEVELOPMENT/LIMITED CAPABILITY

Peru and Bolivia have long mining traditions but weak capability in public environmental management. Due to the current mining boom, the task is to raise environmental management capability to an acceptable level in as short a period as possible. The participation of the private sector in this work is vital. Other important issues include:

1. Priority: Introduction of an "umbrella" environmental law, regulations for the mining sector, and technical guidelines for mining activities.

Solution/Implementation: Due to the urgency of the task and scarcity of local expertise, foreign technical assistance is necessary. However, the work should be done in the host country to ensure that local conditions are given weight and that local personnel become familiar with the background and implications of the legislation being created.

2. Priority: The lack of environmental baseline data regarding natural conditions and those in mining areas makes country-wide or regional SEAs advisable. These will give a first appreciation of existing problems and provide a means of accelerating and ensuring proper planning of environmental reform.

Solution/Implementation: This work will have to be carried out with assistance from abroad and will fulfill the dual purposes of providing needed information and training local personnel.

3. Priority: The creation of competent public management in mining related environmental questions, including the strengthening of the central environmental agency.

Solution/Implementation: Due to either the inadequacy of the civil service or scarcity of local professionals in environmental disciplines, it is vital to efficiently use the limited resources available. This points towards a sectoral approach in the initial stages, by which a special unit within the Ministry of Mining (or equivalent) is charged with environmental permitting and enforcement within the sector. Such a unit should be able to draw on the expertise of the surrounding technical personnel and coordinate well with the unit granting mining concessions. The strengthening of the central environmental agency through training, recruitment and technical assistance, should proceed simultaneously. In order to restrict the workload, it is advisable to encourage as much self-control as possible within

the industry. This can be achieved, for example, through requirements for monitoring routines or by stipulating regular audits by external consultants.

E-4 AGENDA FOR GROUP 4 - EMBRYONIC EMS/VARYING CAPABILITY

The countries of Group 4 are weak in environmental capabilities and management and also lack coherent legislation on the subject. Mining is not a principal economic activity and hence there has been no pressing urgency. Where special environmental directions exist for mining they are incorporated in the Mining Law or associated regulations.

There is no standard course to be recommended for the development of mining environmental management in these countries. Factors such as the size of the country (or provinces in the case of countries with a federal system), the potential for growth of the mining industry, the development of other commerce and industry, and the local availability of expertise, will affect policies and strategies. However, whatever route is chosen, it is vital that the necessary mining expertise be made available to the permitting agency whenever this is required. The process of environmental development will be facilitated by the fact that there is less urgency for reform. The agenda for countries in this group should therefore consider:

1. Priority: The issuance by the government of a policy statement regarding sound environmental management in mining ventures as an advance notice of coming legislation.

Solution/Implementation: A clear policy regarding the government's requirements concerning environmental standards in mining enterprises should be proclaimed. Even if there is no such thing as "accepted international standards", a reference in this direction will give the right signal to foreign and local investors about the character of the legislation which will eventually be installed.

2. Priority: The build-up of basic expertise in mining environmental matters.

Solution/Implementation: Depending on local circumstances, the expertise can be located in an environmental agency, in a ministry of mining or its associated institute, in universities, or in another suitable organization. This expertise would either be part of the unit responsible for environmental permitting or act as an adviser to such a unit. As such expertise would probably still be limited in its capabilities and experience (at least in a smaller country), mechanisms should be established for having additional access, when necessary, to specialists with appropriate knowledge and experience. In the case of large and complicated projects, such expertise may often have to be sought abroad.

COMPARISON OF CHILEAN AND PERUVIAN STABILIZATION AGREEMENT TERMS

The key differences between the stabilization agreements offered to investors in the mining sector by Chile and Peru are the following:

Investor Eligibility

Chile offers stabilization agreements only to foreign investors but requires no minimum investment amount for a 10-year agreement.

Peru offers stabilization agreements to both foreign and domestic investors and requires a minimum investment of $2 million for a 10-year agreement.

Guaranteed Income Tax Rate

Chile guarantees a total effective annual income tax rate of 42% during the term of the agreement, which is higher than the 35% effective rate under current law.

Peru guarantees the annual income tax rate in effect on the date the investment program is approved.

Term of the Agreements for Major Investments

Chile offers a 20 year agreement for investments of at least $50 million.

Peru offers a 15 year agreement for major investments but requires only a $20 million investment in a new mining operation or a $50 million investment in an expansion project, provided that it meets the production capacity requirement.

Administration

Chile's stabilization agreements are granted and administered by the Foreign Investment Commission pursuant to the Foreign Investment Law.

Peru's stabilization agreements are granted and administered by the Ministry of Energy and Mines pursuant to its General Mining Law.

COMPARISON OF STABILIZATION AGREEMENT TERMS

Feature	CHILE		PERU	
1. Investment Required	No minimum	$50 million	$2 million	$20 million[1/]
2. Term of Stabilization	10 years	20 years	10 years	15 years
3. Fiscal Stability				
a. Income tax rate	42% */	42% */	Frozen as of contract date	
b. Tax accounting	-	Frozen as of contract date	a) Frozen as of contract date	b) Accelerated depreciation up to 20%/yr
c. Dollar accounting	-	Yes	-	Yes
d. Options	May opt once into current regulations		May opt once into changed regulations	
e. VAT rate stabilization	Yes **/	Yes **/	Yes	Yes
f. Customs tariff stabilization	Yes **/	Yes **/	Yes	Yes
4. Foreign Exchange Guarantees				
a. Nondiscrimination	Yes	Yes	Yes	Yes
b. Repatriation rights				
i. Profits	Yes	Yes	Yes	Yes
ii. Capital	Yes	Yes	Yes	Yes
- Moratorium	1 Year	1 Year	None	None
c. Maintenance of proceeds abroad	-	Yes	Yes	Yes
d. Most favorable exchange rate	Yes	Yes	-	-
e. Processing time	10 days	10 days	-	-
5. Guaranteed Export Freedom	-	Yes	Yes	Yes

[1] $20 million is the minimum investment in any new mining activity, provided that its initial capacity must be at least 5,000 metric tons/day. $50 million is the minimum investment in either (a) an existing mining operation, provided that the investment results in capacity of 5,000 mt/day, or (b) a privatized mining company.

*/ Guaranteed total effective rate.

**/ Guaranteed during period while investment is being made.

MODEL DISTRIBUTION OF FUNCTIONS BETWEEN THE PUBLIC AND PRIVATE SECTORS

FUNCTIONS	PUBLIC SECTOR						Mixed	PRIVATE SECTOR	
	Government				Autonomous entities		Universities	NGOs	Enterprises
	1a	1b	1c	1d	2	3	4		
Sectoral policy & strategy definition	■			○					
Sectoral law, norms & regulations	■			○					
Mineral concessions		■							
Permitting & control - Environment, water and others	○			■					
Promotion	●								○
Statistics	●								
Data Banks	●	●	■	●	○	○	○	○	○
Geological mapping			■						
Mineral resources studies			■						
Environmental (base line) studies			■						
Natural disasters studies			■						
Other geoscience studies (water, marine geology...)			●						
Technical assistance to mainly informal or small-scale miners								●	●
EIAs, EAs									●
Basic and applied research							●		○
Education							■		
Services related to exploration/exploitations									■
Mineral exploration									■
Mineral exploitation									■

1a: Ministry; 1b: Mining Cadaster; 1c: Geological Survey; 1d: other non-sectoral authorities.
2 Regional development corporations
3 SOEs or other state-owned research/services organizations
4 Universities: public and private

■ Assignment critical to comply with sectoral policy objectives	● Assignment recommended, but non critical to sectoral policy objectives	○ Play a significant role

KEY AREAS FOR TA ACTIVITIES TO SUPPORT THE REFORM OF THE MINING CADASTRAL OFFICE

ACTIVITIES	COUNTRIES GROUPS			
□ Activity which might require limited TA ○ Activity which requires TA ◊ Consultancy contract	TH	TL	NH	NL
Institutional set-up	□	○	□	○
Work organization; development of administrative rules, procedures and standards; administrative flow-sheet	□	○	□	○
Development of the cadastral data bases and GIS	□	○	□	◊
Establishment of a mining cadastral geodetic subnetwork	◊	◊	◊	◊
Integration of pre-reform rights to the new system	□	○	□	○

PROCEDURES FOR TRANSITION TO A MODERN CADASTRAL SYSTEM

The procedures in the mining law for making the transition to a modern cadastral system should include the following elements:

1. A cut-off date after which all applications for mining rights must provide the UTM coordinates of the desired concession's vertices, and otherwise conform to the new criteria.

2. A cadastral standardization procedure, either by government survey or by required compliance filings by holders of existing concessions and applicants to conform their existing or requested concession borders to the new criteria.

3. Publication of the results of the survey or compliance filings, as interpreted by the government.

4. A reasonable opportunity and procedure for affected mining right holders to challenge results of the cadastral survey, or compliance filings which affect their acquired rights.

5. A time limit for issuance of an administrative decision in writing, with justification, in response to such challenges.

6. A procedure for administrative and judicial review of decisions on challenges to the results of the cadastral survey or compliance filings.

7. A final date as of which the cadastral results can no longer be challenged or modified, except as a result of the final outcome of pending appeals. Thereafter, all prior claims of mining rights or portions thereof, which could not be verified or which were not brought into compliance, shall be declared extinguished.

The Chilean mining law reform included such procedures, whereas the Peruvian reform failed to provide for the compliance of pre-existing concessions.

SUSTAINABLE BEST PRACTICE PRIORITIES FOR GEOLOGICAL SURVEYS AND REQUIRED TECHNICAL ASSISTANCE

PROGRAM FIELDS	ACTIVITIES	COUNTRIES			
□ Activity which might require limited TA ◊ Consultancy contracts ○ Activity which requires TA		TH	TL	NH	NL
Regional Geology	Definition/mapping of regional geologic terrains.	□	○	○	◊
	Completion and publication of regional geological sheet maps (1:250,000 to 1:100,000 scale). Limited detailed mapping.	□	□	○	◊
	Archiving and compilation of existing geological information. Limited basic regional geological mapping *)	-	-	-	○
Mineral Resources	Identification of regional scale mineralized target areas for both metallic and non-metallic minerals.	□	□	□	◊
	Regional geophysics (airborne) and geochemistry.	□	○	○	◊
	Completion and publication of regional thematic maps (including for example infrastructure, structural geology, regional geophysics and geochemistry, metallogeny, prospective areas, etc.) (1:500,000 to 1:250,000 scale).	□	○	○	◊
	Regional and/or mining districts mineral resources assessments.	○	○	○	◊
	Archiving and compilation of existing mineral resources information. Limited basic regional mineral mapping *)	-	-	-	○
Water Resources (GS or separate specialized entity)	Regional and limited detailed geology to define water basins characteristics and underground or superficial water bodies productivity.	○	○	○	◊
	Archiving and compilation of existing water resources information *)	-	-	-	○
Energy Resources[1] (GS or separate specialized entity)	Regional geology to define hydrocarbon basins and geothermal zones.	□	○	□	◊
	Compilation of existing information. Limited gathering of new data through regional mapping*)	-	-	-	○
Geohazards and Environmental Studies	Regional and limited detailed integrated environmental base-line studies (background metals contents, groundwater pollution, etc.)	○	○	○	◊
	Natural risks and hazards (seismicity, volcanism); recognition of unstable areas and human risks (landslides, mudflows, floodings, etc.).	□	○	□	◊
	Compilation of existing information. Basic recognition of environmental problems and simple mapping of highest risk areas*)	-	-	-	○
Databases and support facilities	Development of a national Mining Information System (integration of databases and data access service)	□	○	○	◊
	Library and information services.	□	□	□	◊
	National Geological Repository of raw data, geological and exploration samples and information; data access service.	□	-	□	-
	Establishment of a simple repository	-	○	-	○
	Cartography and laboratory (mineralogy, chemistry) facilities	□	-	□	-

★) Data collection, processing and interpretation have to be carried out mainly on the basis of specific free-standing contracts between the government and consultant firms or foreign Geological Surveys.

[1] Consecutive to the privatization of most state-owned oil companies, atention should be paid by Governments to properly store and give public access to the huge amount of regional geological and geophysical information gathered often during decades (cf. cases of Argentina and Peru). Either a specific governmental office can be created to this effect, or the data can be transferred to the Geological Survey if it has the capacity to manage them.

BASIC GEOLOGICAL INFRASTRUCTURE

Role of the geological information

Geological information should be considered part of the economic infrastructure of a country. To the government and society in general, geological information plays an important role as a support for decision making in the management of natural - including mineral - resources. To the mining planners of the private and public sectors, the knowledge of a country's geology, mineral resources and mining related environmental base line conditions are also an indispensable tool for the definition of exploration programs and sound development of the sector.

Mining related basic geological infrastructure

- From a mining point of view, the main components of a basic geological infrastructure are (i) geological maps, (ii) thematic maps and mineral resources assessments, (iii) environmental base line information and (iv), a mining information system. The production and publication of this information is a service offered by the geological survey to the public as well as to the different categories of natural resources decision makers (such as non sectoral authorities, exploration and mining companies and others), in much the same way as topographic maps

Geological maps. These maps present geological information such as rock types distribution and relationships - with accompanying cross-sections of the upper part of the Earth crust and descriptions. The maps are a basic tool for the planning and development of such activities as mining, water resources management, location of civil works (e.g. roads, dams and tunnels), land use management, preservation of the environment, prevention of natural disasters and others. The objective is usually to cover the whole territory of a country with maps at different scales and different degrees of precision[1], and according to established priorities or to a grid system[2]. It is thus a long term activity[3] which covers large areas of land. Several countries in the process of modernizing their mining sectors have launched comprehensive mapping programs. In Argentina, Bolivia, Chile, Ecuador and Peru, all areas with significant mining potential will be mapped at scales of 1:100,000 or 1:250,000 by the year 2000.

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1 The logical sequence would be to start with small scale maps - in general 1:500,000 or 1:250,000 - in order to obtain as fast as possible a general - still rather accurate - image of a country's geology. The next steps would include the production of maps at larger scales (1:100,000 and 1:50,000), according normally to a priority area program.

2 Usually using the same distribution of quadrangles as the topographic mapsheets, when available.

3 A full national coverage of most Latin American countries with a specific generation of geological maps requires approximately from 10 to 20 years, depending on the chosen scale. For updating, less comprehensive programs are needed to actualize the information with respect to improved knowledge or scientific progress.

- **Thematic mapping and mineral resources assessment**. These maps gather resource assessment information which has been processed and published. Their objective is to produce an estimation and evaluation of minerals in the ground, both discovered and undiscovered - based on genetic or typologic models. These regional maps and studies do not include any detailed evaluation of specific deposits. The production of thematic maps normally follows a systematic program in order to cover progressively the whole territory of a country and avoid the concentration of efforts on "traditional" areas[4].
- There are different types of thematic maps, from simple thematic maps with descriptive information such as infrastructure, distribution of metal deposits and related geology or structural data, regional airborne geophysics and geochemistry; to more advanced investigations and data processing resulting in a resource assessment study on a given specific geographical region, a metallogenic province, a particular type of mineralization, or a mining district. Computerized methodologies and mathematical modeling to carry out these tasks are in constant development.
- **Airborne geophysical coverage** - fundamentally magnetometry and radiometry with a "mining-significant" linespace - of regions with mineral potential has proven to be extremely useful, particularly where most of the bedrock is covered by soil or vegetation, or where access is limited. The integration of airborne geophysical and other remote sensing data (satellite imagery, Synthetic Aperture Radar (SAR), and others), accompanied by brief field checks is a powerful tool for quickly selecting potentially ore-bearing areas for further work.
- **Environmental base line information**. The environmental management of a given area requires the availability of a large amount of information regarding natural, social and infrastructure conditions such as the natural geochemical background of soils and waters, geomorphology, geology, distribution and types of mineral deposits, climate, hydrology, flora, fauna, population, human activities, socio-economic conditions and so on. Regional base line environmental studies aim at providing integrated background data for the design or updating of policies and regulations, sectoral or cross-sectoral environmental management plans, the evaluation and monitoring of past or existing contamination, land, water and natural resources use management, infrastructure development planning, etc. For the mining and other industries such data represent the levels against which Environmental Impact Assessments are evaluated.
- An important product consists also in the **mapping of environmentally sensitive areas** where industrial activities might have to be more strictly controlled or even excluded. Basic products include raw and processed data banks, geographically integrated information (GIS), maps and reports. Pilot scale environmental base line studies related to mining have been initiated only very recently in a few countries (Argentina, Bolivia, Chile and Ecuador).

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4 A typical example would be Bolivia, where for decades efforts were focused on the Eastern Cordillera, neglecting almost completely other potentially mineralized areas such as the Western Cordillera/Altiplano, the Sub-Andes and the Precambrian.

Bolivia - The Oruro Pilot Project
A Case of Multidisciplinary Environmental Base Line Study

A Sectoral Environmental Assessment (SEA), financed by the Swedish Government, was carried out in Bolivia in 1992-93 The study emphasized the need to improve environmental management through the development of more systematic base line information and to address in an integrated fashion the complex linkages of existing and potential impacts The study recommended initiation of activities with a pilot project in the Oruro area (15,000 square kilometers) where many major problems related to the presence of mining activities had been identified. The project prioritized the strengthening of local institutions responsible for environmental management and monitoring, and the development of the environmental consciousness of local government, civic and non-governmental organizations.

The "Proyecto Piloto de Oruro" (PPO) is being executed by a multi-disciplinary team of Bolivian and foreign experts in the fields of environmental engineering, ecology, biology, economic geology, hydrogeology, chemistry and geochemistry, economics, mining, metallurgy, tailing dams, acid mine drainage, sociology, toxicology, occupational health and safety and others The supervision of the PPO is the shared responsibility of the Ministry of Sustainable Development and Environment and of the National Secretariat of Mines.

The PPO includes the following main components inventory of human and natural resources, establishment of environmental quality base line data, identification of contamination sources and estimation (quantification when possible) of emissions, characterization of dispersion and deposition patterns, and levels of contamination, evaluation of biological, ecological and health effects of contamination, and of the impacts caused by environmental degradation and resources depletion

The results of the PPO will be presented in the form of reports, maps and data banks which will be used to establish priorities for impact mitigation measures (screening) adapted to the local conditions, cost estimates and a time frame The results will be summarized in a Master Plan of Environmental Management for the Oruro Area

- **Mining Information System**. The MIS is a computer based information network which includes a series of data banks. The system aims at (i) compiling dispersed data under compatible file formats which can be read by all users and/or shared within different types of application[5]; and (ii), facilitating the access to this information through simple and user friendly software and hardware connected first in local (LAN) and then in wide area network (WAN). Simplicity and unity are the key

[5] For example, geological data should be stored in such a format that they can be used both in the case of map editing (vector) and of exploration (raster).

concepts to the development of a successful information system. The information network is initially developed at a pilot scale with a limited number of simple data banks under the coordination of one responsible government agency (usually the Ministry or the Geological survey). The network is later progressively extended to other entities (universities, other governmental agencies, ONGs, etc.) and more complex data banks are integrated to the system, typically generated under the other components of the geological infrastructure. To simplify the setting up and the maintenance of the system, well established commercial or widely used applications should be selected to develop the data banks, and no unnecessary sophisticated hardware should be selected[6]. Considering todays available technology, personal computers (PC) systems are widely recommended. The data are stored within a serie of data bases with, normally, two systems of access: (i) direct access for queries - regarding e.g., bibliography, technical reports, statistics, legal documents, etc. - to data base management platforms such as Excel, Qpro, Dbase, Paradox or Oracle; and (ii), graphic access through a Geographic Information System (GIS). Direct access can be used for the globality of the information, while the graphic access is limited to data connected to geographic coordinates.

Cost aspects

From the experience gathered over recent years in various countries of Latin America, the production cost of the different information components mentioned is estimated as follows:

	USD/km^2
• Geological maps (1:100,000 or 1:250,000)	10-20
• Thematic maps, mineral resources assessment (1:250,000 to 1:500,000)	10-20
• Idem, incl. airborne geophysics and regional geochemistry	50-100
• Environmental base line information	50-100

6 The hardware configuration must be designed after defining precisely the applications which are to be used within the system. The reverse procedure is a frequently observed mistake.

REQUIREMENTS OF A SUSTAINABLE SECTORAL INSTITUTIONAL FRAMEWORK

	NL	NH	TL	TH
MINISTRY or DEPARTMENT OF MINES	Critical. A Department of Mines (DM) or office within a Ministry of Industry or Economy should be set-up or restructured Functions should be limited to basic policymaking, simple sector regulation and monitoring	Critical When the mining potential contribution justifies it, a Secretariat of Mines (SM) or a National Directorate (DNM) should be set up and or structured according to modern State's functions Policy making , regulation development and sector monitoring capacities should be strengthened	Critical A Ministry (MM) or a Department of Mines (SM) should be set up and reformed to fulfill modern State's functions Policy making , regulation development and sector monitoring capacities should be strengthened	
MINING CADASTER OFFICE	Critical A mining cadastral office within the DM or within another non-mining cadastral entity should be set-up and or strengthened Modern but simple technology should be applied to the registration, surveying and monitoring procedures and to the establishment of the mining rights database	Critical A reliable MCO should be established and developed in order to fulfill the legal and technical functions according to modern standards and technology but adapted to simple procedures The MCO has to be administratively autonomous of the SM The size and technological complexity should be designed according to the country s mineral sector	Critical A strong and reliable MCO should be established, developed and strengthened in order to fulfill the legal and technical functions according to modern standards and technology and should be adequate to solve complex inherited problems The MCO has to be administratively autonomous of the MM	
MINING ENVIRONMENT OFFICE	Not critical as a specific unit The functions can be fulfilled by a small specialized working group task force within the DM or within a central environmental authority If sustainable and justified by the country's mineral sector size or problematic a formal office should be set up	Critical A formal office should be set up within the DM in order to coordinate with the overall environmental authority the development sector specific policies regulatory and monitoring instruments, and as an interface between the industry and environmental authorities Size and authority level should be adapted to the country's mineral sector	Critical A formal office should be set up within the MM in order to coordinate with the overall environmental authority the development of sector specific policies, regulatory and monitoring instruments; an as an interface between the industry and environmental authorities Capacity to manage complex inherited environmental liability problems should be developed	
GEOLOGICAL SERVICE	Not critical as a specific unit Set up of a GS should be carefully evaluated on the basis of long term sustainability regarding financial and human resources Alternatives should be considered, such as the integration of functions into a natural resources cross-sectoral entity or as a small geological data compilation-management unit in the SM-DM Regional alternatives might also be evaluated	Critical An autonomous GS should be set up and structured The number and complexity of activities should be limited to basic core programs Complexity might be later developed according to resources, needs and increase of experience	Critical An autonomous GS should be set up and structured The number and complexity of activities should be limited to basic core programs in order to ensure long term sustainibility and results	Critical An autonomous GS should be set up and structured The number and complexity of activities should be limited to basic core programs If sustainable, complexity might be progressively increased according to needs and resources
ESTIMATED ANNUAL BUDGET RANGE REQUIRED (.000 USD)	1 000 - 5.000	5.000 - 10.000	5 000 - 10.000	10.000 - 50.000

BOLIVIA SECTORAL ENVIRONMENTAL ASSESSMENT

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In separate pocket at back cover:
Master Map Colquiri, Scale 1:5,000

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SOCIAL ASSESSMENT

KEY ELEMENTS

A. INTRODUCTION

SA provides a framework for incorporating participation and social analysis into project design. SAs are carried out in the project context in order to: (a) identify key stakeholders and establish an appropriate framework for their participation in project selection, design, implementation, monitoring and evaluation; (b) ensure that project objectives and incentives for change are acceptable to the people intended to benefit and that gender, ethnicity and other social differences are taken into account in project design; (c) assess the social impact of investment projects, and where adverse impacts are identified to determine how they can be avoided, minimized or substantially mitigated; and (d) develop the capacity to enable participation, resolve conflict, permit service delivery and carry out mitigation measures in ways that are socially sound.

B. STAKEHOLDER PARTICIPATION

Stakeholder identification is essential to the SA process. "Good practice" begins with identifying *who* should be involved including stakeholders at the local, national and international level, and developing a process for *how* to involve them throughout planning and implementation. Some stakeholders may be identified at the earliest stages of project identification, but others will be identified or come forward later. Stakeholders are a driving force in identifying social concerns, gathering information, setting priorities, and developing strategies to enhance project benefits and minimize negative effects.

A wide variety of interest groups are stakeholders in mining operations. First, *the government* has primary responsibility for the social assessment and public involvement process, and also for representing its own interests and policies. However, different agencies within a national government may have differing interests (for example the Ministry of Environment and Ministry of Mining), and local governments may have different views than regional or national policymakers. Second, *private enterprise*, including mining companies, informal miners and contractors, may be affected by economic, physical and social changes associated with mining operations. Some business may benefit, for example, from development of new markets for their products while others may be displaced by a shift to mining as the dominant industry in a particular area. Third, *local groups* including those who live or obtain their livelihood in and around the mine site and surrounding urban centers may be impacted. They may have immediate concerns about income, food security, health, land tenure, cultural property, resettlement, compensation, migration, and so on. Disadvantaged or at-risk groups such as indigenous people, women, children, minorities and landless households require special attention. *Civil society* including international, local and national groups have become players in many international mining projects. Academic institutions often serve advocacy roles,

undertaking research generating public awareness and debate. Finally, important *international donors* have an interest in assuring that mining operations set well-defined, achievable goals, and an adequate implementation plan.

C. DETERMINING KEY SOCIAL ISSUES

One purpose of SA is to determine the social issues related to mining operations which need to be taken into account. This includes issues arising from the social context in which the project will be, or is being, implemented, and those related to the social consequences that may result. Information will also come from additional sources including desk reviews of secondary data and sometimes research by social scientists. Both quantitative data -- for example, the number of people whose land and incomes will or are being affected; and qualitative information -- for example, ethnographic observations about indigenous resource management, can provide relevant information.

Social factors that affect mining operations will vary within a particular sociocultural context. Social scientists have developed a number of different systems for describing the social factors related to development. No one scheme is definitive, but some useful categories are as follows.

Demographic factors
Demographic factors include population characteristics: the number, density, local and migration of people in the project area. Definition of the project area will also be important. This should include the area indirectly, as well as directly, affected by the mining operation. Basic demographic description is part of the social assessment for all projects. It alerts project planners to who the stakeholders are, what they are like, how their location and/or way of life might introduce potential constraints on project design, and what adverse effects may need to be addressed.

Projects that involve *population shifts*, particularly involuntary resettlement, require especially careful attention. For example, major construction may mean relocation, either voluntary or involuntary, of local populations. Community life can be disrupted by an influx of workers and camp followers from outside the region especially during the construction or expansion phase of a large new mine, drawn by prospects of income or improved living conditions. Both the people that resettle and those in communities that experience in-migration or out-migration of others are important.

Social diversity
Access to power and resources is influenced by gender, social status, location (region, rural or urban residence) and other social and political factors which affect the desire and ability of people to benefit from development projects. Social assessments help disaggregate the population and determine who are the winners and who the losers.

Gender, which refers to the attributes of men and women that affect their roles and their access to resources, is a particularly important aspect of social diversity. For example, a

new or expanded mine in an area may affect -- either positively or negatively the access of women to education, employment, land, credit, and other resources. Projects may change gender roles and gender roles may have implications for projects.

Indigenous people and vulnerable minority living in and around a mining area are also of specific concern. (see Annex 11)

Livelihood Issues
Socio-economic factors that affect livelihood include individual, community and customary rights of access and tenure to land and other resources, availability of employment opportunities, family composition, and labor migration. The employment provided by the mine and associated activities can cause communities to be divided into groups of "haves" (i.e. families with improved incomes where at least one family member has a good paying job directly with or associated with the mine) and "have nots" (where none of the family members have obtained employment and incomes are negligible). The sudden increase in income for the community can also cause a rise in the cost of living, increased use of alcohol, and a breakdown in family structures. But well-designed projects may enhance income and economic stability. Increasingly mining operations in regions such as Asia are developing creative funding mechanisms whereby broad community and local authorities can participate in the benefits generated by the mining operations.

Social organization
Social organizations are the building blocks of development. The family is a basic unit of social organization, but organizations exist at every level. *Community* organizations involve local populations woven together by a sense of common purpose and values, and by networks of mutual support and inter-dependency. *Social organizations*, including social networks and relationships, provide the basis for action. The capacity of formal and informal organizations at the local, regional and national level affects the flow of resources, the capacity of stakeholders to participate and the ability to deliver development goods and services.

Socio-political context
Socio-political context is a key factor in whether agencies are willing and able to make commitments to mining operations and to follow through during implementation and mine closure. Consultation also provides early opportunities to build capacity and establish accountability that will be needed later to meet the demands of the project during implementation and mine closure.

Addressing *perceived risks* is important in addition to meeting social needs. Health issues may be perceived as a threat to nearby communities. A participation strategy that includes teaching stakeholders about the project, listening to concerns, and encouraging stakeholders to participate in planning and monitoring is an effective strategy for building support.

Resettlement

Resettlement is the process of people relocating their homes, either voluntarily in response to new opportunities or involuntarily as a result of project land requirements. *Involuntary resettlement* may produce severe adverse consequences and projects with involuntary resettlement should provide for income restoration.

Health

Health impacts should be evaluated in social assessments, although it may also be addressed in environmental assessment. Mining operations may introduce new concerns about occupational and public health and safety risks that should be addressed during project preparation and throughout the life of the mine. Mining operations can also cause harm and injury to local people especially children if they stray into the mining area or if heavy trucks or equipment use the local roads. Mining operations can attract unemployed persons from other areas who settle nearby even though unable to obtain regular employment with the results that shanty areas can develop with inadequate water supply, sanitation, heath services, schools and generally difficult living conditions. Projects that involve resettlement may result in profound psychological stress.

INDIGENOUS PEOPLES

Indigenous peoples and vulnerable minorities living in and around a mining area are of specific concern. The Bank, the United Nations and many donors and NGOs, define *indigenous peoples* as "social groups with a social and cultural identify distinct from the dominant society that makes them vulnerable to being disadvantaged in the development process." Usually, these peoples have (a) close attachments to ancestral territories and to the natural resources in these areas; (b) are self-identified and identified by others as members of a distinct cultural group; (c) speak a language which is often different than the national language; (d) possess customary social and political institutions; and, (e) primarily practice subsistence-oriented production. Special attention must be given in order to assure these people that they have a voice in project development; that they have security over land and other resources; that projects do not undermine their cultural identity or have other adverse impacts; and that they can benefit, if they choose to do so, from the operations.

For example, informal miners represent a constant hazard to native populations of the Amazon areas. The remote and temporary location and the lack of contact with formal society of the typical settlement of Amazon miners provides it with an environment which facilitates widespread violence and the proliferation of unlawful activities including tax evasion, prostitution, etc.. The Brazilian garimpeiros have a long history of ignoring regulations regarding tribal lands and the rights of indigenous communities.

Social Diversity Issues

Projects which affect indigenous peoples should ensure that they do not suffer adverse effects and that they receive culturally compatible social and economic benefits. This is done through the design of special Indigenous Peoples Development Plans. These plans should be designed with the "informed participation" of the affected population, incorporate indigenous knowledge into the approaches proposed, and not create or increase the dependency of the indigenous peoples on project entities. Where appropriate, steps should also be taken to ensure the continued possession and access of indigenous peoples to lands and natural resources which are vital to the livelihoods and cultural reproduction. Particular attention should be paid to:

- *Ancestral rights* are important issues for indigenous peoples. This refers to community, owned and managed resources, such as burial grounds, sacred groves, community pasture, forest, and water bodies used for livelihood and customary practices. Projects may contain components to preserve these rights.

- *Cultural property* are sites having archaeological (prehistoric) paleontological, historical, religious, and unique natural values. Cultural property, therefore, encompasses both remains left by previous human inhabitants (for example, middens, shrines, and burial grounds), and unique natural environmental features such as

canyons and waterfalls." Projects should attempt to minimize adverse impacts as cultural property and protect and conserve them where possible.

- *Language* is another aspect of social diversity which has implications for participation and project design. Key communications should be in appropriate languages to facilitate involvement of stakeholders, and social assessment should identify any barriers to involvement which may be caused by language diversity.

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