



The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development

A MINING POLICY FRAMEWORK

Mining and Sustainable Development

managing one to advance the other

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Preamble

Origins and Mandate of the Forum

At the World Summit on Sustainable Development in Johannesburg in 2002, a number of countries with an interest in mining decided to take action to demonstrate that the mining sector can be a significant driver of development. They worked together to draft what is now paragraph 46 of the Johannesburg Plan of Implementation (JPOI). This paragraph recognizes the positive contribution of mining to sustainable development but, more importantly, also identifies priorities that need to be addressed to ensure and enhance the potential contribution of mining to sustainable development.

To mobilize and coordinate efforts to put the JPOI into more widespread effect, a partnership was formed amongst interested countries. Their efforts led to the 2005 inauguration of the IGF (formerly known as the Global Dialogue on Mining/Metals and Sustainable Development). The IGF is formally recognized by the UN as a partnership linked to the Johannesburg Summit.

The IGF has now become the leading global intergovernmental policy forum on mining and sustainable development. Membership is open to all member countries of the United Nations that have an interest in effectively managing their mining/metal sector for development benefits. It is a member-led, voluntary partnership. National representatives at the Forum are officials with the lead responsibility for the mining and mining-related activity in their country.

The objectives of the Forum are to improve, enhance, and promote the contribution of the mining, minerals and metals sector to sustainable development and poverty reduction. Through sharing experiences and developments across the sector, the Forum helps enhance capacity for the improved management of member countries' mineral wealth.

Membership as of 2010

The 43 members of the Forum are Argentina, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Canada, the Dominican Republic, Ethiopia, Gabon, Ghana, India, Jamaica, Kazakhstan, Kenya, the Kyrgyz Republic, Madagascar, Malawi, Mali, Mauritania, Mexico, Mongolia, Morocco, Mozambique, Namibia, Niger, Nigeria, Papua New Guinea, Peru, Philippines, the Republic of Guinea, Romania, the Russian Federation, Senegal, Sierra Leone, South Africa, Suriname, Swaziland, Tanzania, Uganda, the United

Kingdom, Uruguay, and Zambia. Government delegations can comprise industry and other interest groups. Multilateral and intergovernmental organizations have observer status.

The work of the IGF

The main topics addressed by the Forum are identified by member countries. The agenda of the meetings reflect their views of the key priorities at the time as well as those of the JPOI. Much of the work of the Forum is captured on its website: <http://www.globaldialogue.info/> It is noteworthy that the work of the Forum is done with the full participation of a range of observers and stakeholders.

The meetings of the IGF are hosted by the United Nations Conference on Trade and Development (UNCTAD). The IGF is serviced by a secretariat provided by Canada and, over the years, has received financial support from the Governments of the United Kingdom and Northern Ireland, Germany, Canada and United Nations agencies such as UNDESA and UNCTAD.

The Forum and the UNCSD process

Consistent with its origins as a partnership of the 2002 World Summit, the Forum reported on its activities and progress in the course of the CSD 18 meeting.

As its contribution to the CSD 19 objective of developing a way forward for continuing progress, the Forum is pleased to submit the policy Framework for consideration by the CSD 19 delegates as well as other organizations and stakeholders with an interest in mining.

In support of the development of this policy Framework, the Forum relied first on its extensive work program. It also conducted an extensive survey of mining in member countries. The results of this survey were further discussed in the course of the 2009 IGF Annual General Meeting. This policy Framework was finally endorsed by Forum members at the 2010 Annual General Meeting.

The members of the IGF present this Framework to the delegates at CSD 19 as a compendium of activities they have identified as best practices for exercising good governance of the mining sector and promoting the generation and equitable sharing of benefits in a manner that will contribute to sustainable development.

Forum members agree that good governance of both public and private institutions is a necessary condition for the contribution of the sector to sustainability. The key aspect of good governance for mining relates to the proper management of the mining activity itself. Sustainability however needs to go beyond the mining activity. Like any other business, a mine will close at some time. Sustainability is the outcome of transforming the assets generated in the course of mining into other forms of assets that persist beyond the mine closure and are tools for development beyond the mining sector. This process also requires good governance in the management of all the revenue streams resulting from mining investments, such as foreign capital inflows, royalties, licence fees, direct and indirect tax revenues, infrastructure investment and the like.

Forum members have made great progress over the last few years towards putting in place many of the processes outlined in this Framework. They are also aware of the need to improve the functioning of those processes. This raises the issue of capacity for good governance.

The Framework is therefore also a call to the international community, particularly the UN and donor agencies, to enhance support towards capacity building that promotes the good governance of the mining/metals sector and its contribution to sustainability. Starting in the nineties, most development agencies exited support for the sector. There is a need for renewed focus on capacity building to ensure that the lessons learned in the recent past become the reference or base line of mining globally.

A rich natural resource endowment provides a large number of developing countries with a comparative economic advantage. Mining is an activity that is complex and requires significant capacity for its proper management. This opportunity mining provides to generate benefits must be used effectively to advance sustainable economic development and reduce poverty.

Mining and Sustainable Development: managing one to advance the other

PART ONE: Policy Framework

The members of the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development offer this policy Framework as a comprehensive model that, progressively implemented, will allow mining to make its maximum contribution to the sustainable development of developing countries.

At the World Summit on Sustainable Development in 2002, a number of countries with an interest in mining decided to take action to ensure and enhance the contributions of mining to sustainable development and to identify the priorities that needed to be addressed. As a result, the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) was formed and has become the leading global intergovernmental policy forum on mining and sustainable development.

The objectives of the IGF are to improve and promote the contribution of the mining, minerals and metals sector to sustainable development and poverty reduction.

The members of the IGF present this comprehensive Framework to CSD 19 delegates for their consideration and endorsement. It represents the best practices required for good environmental, social and economic governance of the mining sector and the generation and equitable sharing of benefits in a manner that will contribute to sustainable development.

The Framework has universal application. It is as ambitious as it is necessary, particularly for developing countries. It represents the commitment of the IGF members to ensuring that mining activities within their jurisdictions are compatible with the objectives of sustainable development and poverty reduction. Lastly, it underlines the need for the international community, particularly the UN, World Bank and donor agencies, to increase its capacity to work in the mining/metals sector and to support capacity building and other assistance in the mining/metals sector of developing countries.

Legal and Policy Environment

A mature modern legislative regime is one that provides clear lines of responsibility and

accountability. Such a regime provides the foundation of good governance and contributes to sustainable development in all aspects of social and economic life.

To this end Governments should consider:

The ongoing generation of and access to geological information

The generation of baseline geological, topographical and other information for national land use planning, and making that information available to individuals, communities and other civil society actors with equal access to ensure that consultations between different parties can take place on an equal footing.

The revision and periodic updating of mining codes and standards

Mining codes and standards revised and updated to reflect changing knowledge and best practice. They should deal with all aspects of mining from exploration to closure and post-closure management. The data and reporting requirements by entities should be made explicit in exploration and operating licences so that authorities can make informed decisions.

A permitting process that requires:

Mining entities, in preparing their applications for a mining permit, to consult with communities and other stakeholders at all stages of the assessment and planning process and to document the nature and results of their engagement programme in the permit application;

The submission of integrated social, economic and environmental assessments. In addition to a baseline description of current conditions, permit submissions should describe possible risks and impacts of the mining activities together with proposed mitigation or management measures;

The permit submissions to identify and quantify opportunities and propose programmes that lead to the creation of sustainable benefits over the life of the project;

The permit application to be considered complete only when it includes acceptable plans for the eventual closure of the mine and the provision of adequate financial assurance to cover the costs of closure and any ongoing monitoring;

The permit applications, when applicable, to address indigenous peoples, cultural heritage, resettlement, and community safety and security issues;

Mining entities to have a process of consultation that provides affected communities with an opportunity to express their views on project risks and impacts, and be consulted on the development of mitigation measures; and

Completion of the process in a timely, transparent, unambiguous and consistent manner.

Financial Benefit Optimization

Taxes and royalty revenues derived from exploration, mine development and mining reflect the value to society of the resources mined. They are collected and put to work in support of the sustainable development of the nation.

To this end Governments should consider:

The implementation of a revenue generation (taxation and royalties) scheme that:

Optimizes the return from the mining activity and the taxation agreements achieved with foreign and domestic investors in a manner that reflects the different realities they face;

Optimizes the resource levy revenues to society during times of high prices, while minimizing the need for entities to reduce or end production during times of low prices, and supporting a variety of sustainable development objectives; and

Seeks to integrate the mineral sector with other sectors of the economy so as to optimize the contributions of the mineral sector.

A mining policy that:

Maintains sufficient flexibility to ensure that a balance is achieved between optimizing revenue from mining activities while permitting the mine developers and operators an adequate rate of return on their investment;

Uses national corporate income taxes based on net profits as the common element for large and small scale commercial mining; and

Applies such taxes in the same manner as to non-mining entities within a jurisdiction but with the potential for allowances specific to mining for defined expenditures and/or accelerated deductions to achieve specific public policy aims.

The need for human and intellectual resources to manage the sector such that:

There is adequate governmental capacity to negotiate the financial terms and conditions of mineral development agreements, to administer the tax system and the agreements, to deal with transfer and other pricing issues, and to audit the results;

There is knowledge of how mineral development agreements are developed in other jurisdictions and the degree to which they are serving national objectives. Domestic competence in these matters should be considered a priority and, as necessary, be supplemented with independent third party expertise.

The integration of fiscal instruments and policy objectives such that:

All negotiations on mineral development agreements and licenses should take into consideration national policy objectives and how the agreements can support them.

Addressing the issue of the distribution of benefits by:

Providing open and transparent data on tax and royalty flows and how the benefits have been distributed at the local, regional and national levels. Governments may wish to consider how to benefit from initiatives such as the Extractive Industries Transparency Initiative (EITI); and

Using different mechanisms to maximize the transparency, understanding and acceptance of how the direct financial flows from mining operations are apportioned in ways that are appropriate to their political and legal systems.

Socio-economic Benefit Optimization

The conversion of natural capital into human capital holds the greatest promise for sustainable outcomes from mining activities.

To this end Governments should consider:

The need to integrate community, regional and national issues by:

Integrating mines and mining into the local, regional and national fabrics;

Making socio-economic planning a formal part of the permitting process;

Addressing mining operation effects, interactions or local, regional and national dependencies, in initial documentation and in regular reporting;

Making consultation with affected stakeholders a requirement of the permitting process and at every stage of the mining cycle;

Making planning subject to review and approval for the original permit; and

Making the original permit subject to regular review and periodic revision to reflect new goals and changing conditions.

Making education a national priority by:

In a manner consistent with local and national needs, targeting every level of education from primary to post-graduate levels;

Ensuring that both the physical infrastructure and the human resources to staff and service educational facilities are put in place and up-graded over time through the efforts of all stakeholders, including the permit holder; and

Ensuring that, with government leadership, stakeholders other than the permit holder assume greater responsibility over time so that when closure of the mine approaches the physical and human educational infrastructure can make the post-closure transition with a minimum of disruption.

Addressing community health by:

Including health considerations in the baseline socio- economic assessment required by mining entities during the permitting process;

Working with mining entities as well as with communities in the planning and priority setting for health services that the entities may have undertaken to provide; and

Leading with other stakeholders to gradually assume responsibility for this activity from mining entities so that when closure of the mine approaches the physical and human public health infrastructure can make the post-closure transition with a minimum of disruption.

Ensuring high standards for occupational health and safety by:

Ensuring that each company within its jurisdiction accepts corporate responsibility for occupational health and safety through an appropriate set of legal requirements, as well as through governmental monitoring, inspection and enforcement activities;

Ensuring that failures in occupational safety and health performance are effectively dealt with to prevent reoccurrence and are supported by a system of penalties up to and including the revocation of operating permits; and

Requiring entities to provide the education, training, equipment, and adequate system that will reduce hazards and minimize the risk of accidents, injury, and disease and create a safety-conscious environment.

Optimizing employment opportunities at the mine by:

Requiring that socio-economic plans be part of the permitting process and seeking to optimize the employment of host nationals, particularly those from the vicinity of the mine. Depending on national circumstances, educational and other elements will have increasing the national presence in the operation of the mine, including increasing levels of managerial responsibility as an objective.

Creating business development opportunities by:

Putting in place a supportive legal and fiscal environment so that the socio-economic plan developed by the permit holder and approved by the government includes the promotion of

opportunities for local, regional and national supply of goods and services to the mine, the community and the region; and

Promoting new non-mine related industrial and service business opportunities made possible by infrastructure put in place for the mine.

Addressing potential security issues by:

Working with entities to address issues that may give rise to security concerns before issuing permits or commencing operations. Governments and entities should consider using the tools and programmes of the socio-economic plan to resolve or reduce the potential for disputes and be guided in their actions by international norms such as those represented by the International Finance Corporation Performance Standards on Social and Environmental Sustainability and the Voluntary Principles on Security and Human Rights;

Not issuing permits when a deposit to be mined is in an area of active armed conflict. When there is already active development or an operating mine when conflict breaks out, governments and operating entities should act to protect human rights and ensure the safety of miners, their families and communities in accordance with the OECD guidelines. If this does not prove possible, governments may consider removing the mine operation from the dynamics of the conflict by any means possible, including by revoking the mine permit and shutting the mine down.

The importance of respecting human rights, indigenous peoples, and cultural heritage by:

Ensuring that domestic policies and laws are (at a minimum) consistent with international law and norms. With regard to indigenous peoples, governments and mining entities should respect the spirit and intent of current and future international normative language such as is found in the International Finance Corporation Performance Standards on Social and Environmental Sustainability; and

Ensuring that high standards of conduct are observed by mining operations in their countries and requiring that mining entities, in their permit applications and day-to-day operations, are knowledgeable of and act in ways consistent with national laws and international laws and norms.

Environmental Management

The management of the natural resource base within ecosystems is the continuous responsibility of any society seeking to become more sustainable.

To this end Governments should consider:

Management of water by:

Having appropriate environmental management standards in place for the use of surface and ground water. These standards would be strictly monitored, and have appropriate penalties should they be compromised;

Requiring that mining entities ensure that the quality and quantity of mine effluent streams discharged to the environment, including storm water, leach pad drainage, process effluents, and mine works drainage, are managed and treated to meet established effluent discharge guideline values;

Requiring that mining entities ensure that water-leaching or percolating waste dumps, tailings storage areas and leach pads have equivalent protection; and

Requiring that mining entities have in place practices and plans that minimize the likelihood of impacts beyond the mining site, particularly potential trans-boundary impacts.

Avoiding and minimizing potential adverse effects to biodiversity by:

Requiring that mining entities submit environmental management programmes and updates for approval, during the permitting process and whenever there are significant process or operational changes during the operating life of the mine;

Identifying, monitoring and addressing potential and actual risks and impacts to biodiversity throughout the mining cycle; and

Requiring that mining entities conduct monitoring on a continuous basis based on national standards and the conditions of the operating permit, compile and submit performance assessments to government and publish regular reports that are readily accessible to the public.

Managing mining wastes by:

Ensuring that structures such as waste dumps and tailing storage facilities are planned, designed, and operated such that geotechnical risks and environmental impacts are appropriately assessed and managed throughout the entire mine cycle and after mine closure; Requiring that mining entities design, operate and maintain mine waste structures according to internationally recognized standards; and

Requiring that mining entities commission independent expert reviews and report to governments prior to development approval, when changes in design are proposed, and at regular intervals during the operating phase.

The development and implementation of an emergency preparedness programme by:

Requiring all mining operations to have an emergency preparedness and response programme prior to commencement of operations and ensuring that the programme be reviewed, tested and updated on a regular basis;

Basing all elements of the emergency preparedness programme on ongoing consultation and cooperation with local and other stakeholders and government;

Ensuring that monitoring of the effectiveness and responsiveness of the emergency preparedness programme is conducted by companies in cooperation with communities and all levels of government;

Ensuring that mine emergency plans are comprehensive and meet current best practice standards, specifically by:

- *Requiring the development of emergency preparedness programmes as part of an environmental impact assessment for any new operation;*
- *Requiring regular review and updating of such programmes;*
- *Requiring consultation and cooperation with local, regional, national and, as appropriate, trans-boundary stakeholders in the development and maintenance of emergency preparedness programmes;*
- *Endorsing and promoting international best practices, such as the APELL process, at national or regional levels to better coordinate emergency preparedness between mining entities, local authorities and local populations; and*
- *Ensuring that appropriate government departments and agencies at the national, regional and local levels are aware of and prepared to cooperate with mining company response actions.*

Post-mining Transition

A mining operation which is considered consistent with sustainable development is one whereby planning for closure is present during the entire operation of the mine.

To this end Governments should consider:

Ensuring that closure plans prepared by mining entities are of a high standard and updated on a regular basis by:

Providing legal and regulatory frameworks for closure;

Having the institutional capacity to monitor and enforce its provisions;

Requiring that stakeholders be consulted in the development of closure objectives and plans;

Requiring that a comprehensive closure report and adequate financial assurance be provided before the requisite development and mining permits for a new mine are approved;

Requiring the use of external experts by entities to contribute to the development of closure plans and to validate the risk assessments, studies and activities associated with high risk elements such as tailings dams, waste dumps and acid rock drainage;

Requiring that internationally accepted guidelines and best practices (such as IFC Performance Standards on Social & Environmental Sustainability) be followed;

Requiring the periodic reassessment and independent auditing of closure plans: more frequently for mines with an expected short operating life, less frequently for large operations with economic life expectancies measured in decades; and

Putting in place a framework to encourage progressive rehabilitation in mining areas as soon as the disturbed area is not longer needed for mining. This would reduce future closure liabilities and reverse or minimizes future environmental, economic and social impacts.

The development of financial assurance mechanisms for mine closure by:

Ensuring that financial assurance for closure and post-closure expenses is present and adequate to the task and by adopting legislation, regulations and guidelines for financial assurance. These would:

- *Require an adequate level of financial assurance based on realistic estimates to cover the cost of all outstanding work programmes at any time, including premature closure and the conduct of closure programmes by third party contractors in the event that the mine operator is unable or unavailable to complete the work;*
- *Require that each closure plan and its cost estimates be validated or approved by the responsible authorities;*
- *Establish appropriate forms of financial security (bonds, insurance, etc.), including their specific details and conditions;*
- *Require that the financial securities be issued or held only by qualified and approved financial institutions;*
- *Give governments, based on their sole discretion, the right to gain immediate and unencumbered access to the full amount of the financial assurance securities; and*
- *Allow the draw-down or release of security instruments only as each work programme or other requirement is satisfied.*

Accept a leadership role for orphaned and abandoned mines in their jurisdiction by:

Working in partnership with entities that collectively constitute the mining industry to explore options for developing technological solutions (including the reprocessing of mining wastes) or contributing expertise or other resources to help resolve the legacy issue of orphaned or abandoned mines;

Working in partnership with those countries whose economies benefitted from the flow of low-cost industrial inputs that came at least in part from mines that are now orphaned or abandoned that contribute to the resolution or management of abandoned mines;

Using targeted fiscal arrangements to encourage the re-activation of those mines to create economic activity, fund remediation, and provide for post-closure management In cases where such a mine or its wastes have economic potential; and

Seeking recognition by multilateral agencies and organizations that the historical and legal situation of such mines, particularly in developing countries, requires their leadership in managerial, advisory, hortatory and financial forms.

Artisanal and small scale mining (ASM)

Artisanal and small scale mining is a complex and diversified sector that includes poor informal individual miners seeking to eke out or supplement a subsistence livelihood, to small-scale formal commercial mining entities that can produce minerals in a responsible way respecting local laws.

To enhance the quality of life of those miners working outside of the legal framework and to enhance their contribution to sustainable development, governments should consider:

Ways of integrating informal ASM activities into the legal system by:

Creating clear legal frameworks and regulatory mechanisms to facilitate the organisation of ASM, access to property rights and ensuing obligations for ASM;

Providing technical support to build the capacity of government or other bodies tasked with regulating and supporting the sector; and

Developing and replicating formalization strategies on the basis of lessons learned.

Ways of integrating informal ASM activities into the formal economic system by:

Improving savings in the artisanal mining community, establishing more acceptable forms of financing and encouraging responsible investment;

Strengthening the appropriateness, viability and transparency of policies and systems for collection, management and reinvestment of ASM revenue;

Encouraging initiatives for standards and certification of ASM "fair trade" conflict free minerals to harmonize and grow in scale; and

Encouraging, through the permitting process or at other times, entities to explore ways to collaborate with ASM when ASM is present or can reasonably be anticipated to follow the development of a mine.

Reducing the social and environmental impacts of ASM by:

Providing technical training to improve productivity and to safeguard the environment, and developing, disseminating and enforcing regulations with a particular emphasis on safeguarding water sources, reducing deforestation, ending or reducing the use of mercury, and improving the management of mercury and other toxic substances when it is not possible to eliminate them, including safe working conditions, access to health care, etc;

Having national programs that provide minimal standards of health and education to ASM workers and their families;

Making a significant and verifiable reduction in the number of children employed in artisanal mining and improvements in the nature and scheduling of their work so as to accommodate educational needs;

Strengthening, monitoring and enforcing laws on child labour in artisanal and small scale mining areas;

Strengthening the role and security of women in ASM; and

Promoting the inclusion of ASM in rural development and job creation policies such that, where desired and realistic, alternative livelihoods are promoted.



Mining and Sustainable Development: managing one to advance the other

Part Two: Analysis

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Introduction

The members of the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development offer this policy Framework as a comprehensive model that, progressively implemented, will allow mining to make its maximum contribution to the sustainable development of developing countries.

Sustainable development and mining can be compatible. In a number of countries and over time, mining has led to the creation of economic activity and financial and social infrastructure, created skilled workforces and contributed to sustainable wealth creation. Mining can contribute to more national economies in the future. The organizational tools and institutional capacities needed to achieve this – and to avoid lesser outcomes – are known and realizable.

This is the view of the mines ministries from countries that are members of the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF). They have debated, compared experiences, and profited over the last five years from the sharing of their national experience in mining as well as from exchanges with multilateral organisations, NGOs, academics and industry. As an outcome of their work, they have agreed to develop this policy Framework to set out their views on the conditions necessary for mining to achieve its maximum contributions.

It is understood that this view of mining as an instrument for sustainable development is at odds with widely held perceptions in many quarters, and that the record of how mining has been conducted – or the political environment within which mining sometimes takes place – provides important examples of how mining activities can be implicated in negative human, economic and environmental outcomes. These perceptions have roots in the historical experience, the recent past, and all is not well in every mining operation today.

This need not be the case. Both the practice and the perception of mining can be changed and the overall historical record is impressive. Extracting minerals from the ground is one of the oldest human activities and has identified major periods of human development: the ages of stone, bronze and iron. Today about ninety percent of global mining takes place in the developed and emerging countries regarded as the most economically successful. The countries that launched the industrial age were all major mining countries and some (e.g., United States) still remain so. Mining provided the materials and generated the pools of capital that fuelled the industrial revolution and laid the foundations of their modern societies.

Now all societies aspire to the living standards of these developed economies but wish to apply the lessons of experience and proceed in a sustainable manner. This requires, however, changes in understanding, behaviour and practices by all actors, including governments.

There is an extensive academic, institutional and stakeholder-inspired literature on every aspect of mining activity, from exploration to mine closure, from the economic, social and environmental perspective. The concepts and insights have been elaborated; positive role models and case studies already exist. This knowledge, empirical observation, historical experience and cultural sensibility now need to be more broadly applied.

This paper provides a comprehensive Framework which allows governments to use mining as an instrument for achieving environmental, social and economic objectives. Considered implementation over time of this roadmap will maximize the opportunities for mining activities to contribute to sustainable development.

Understandably, the focus is on those elements for which mining departments are responsible. At the same time, no element can be managed in isolation and there are broader high-level competencies and capacities needed to support all economic and social activities of a society. For this reason appropriate institutional infrastructure and governance practices need to exist for optimal outcomes from mining to be achieved.

Mining in Context

The challenges to sustainability come from the needs of a growing population and aspirations for a higher quality of life. The scope, number and persistence of human needs and expectations stress the capacity of the environment to sustain society: industrial agriculture, forestry, and fishing; urbanization; industrialization, and mass tourism are just some examples. And every issue of sustainability that has been raised in the context of mining – from biodiversity to human rights – can also be found, in varying degrees, in these human activities.¹

Mining is necessary to meet the needs and aspirations of current and future populations. At the same time, it imposes its own stresses on the environment and people. It is an extractive industry practiced for hundreds of thousands of years. It currently employs approximately 30,000,000 people (ILO) or approximately 1% of the economically active population of the world (estimate based on ILO statistics).² Every nation has some type of mining activity, with its importance varying with the resource endowment and state of development.

¹ Mining of certain products, particularly diamonds, has in some cases been linked to the cause of conflict or the ability of conflict to continue because financed by profits from mining. The debate over the root causes of the conflicts – racial, ethnic, religious differences; population pressures; political ambition – continues to expand. A recent study found strong links between rising temperatures (with increasing crop failure) and higher levels of conflict : “Warming Increases the Risk of Civil War in Africa”, Proceedings of the National Academy of Science, <http://www.pnas.org/content/early/2009/11/20/0907998106.abstract?sid=ac21d18b-7233-4f73-b03b-061beacd7ced>

² This does not include recycling: the collection, transportation, and re-processing of metals and usable materials. In many countries the percentage of population thus engaged is greater than that in the formal mining sector.

Mining takes mineral, metal or rock (in the form of sand, gravel, building stone, etc) from the Earth's surface and makes it available for human use primarily as a material but also in the form of chemicals. The resource base from which those products are extracted is reduced to the extent that the products are extracted. In most cases – and unlike the other prominent extractive industry, oil and gas – the material is switched from one inventory (nature) to another (society). This transfer between inventories – the act of mining – is only the first essential step in the life cycle of materials. There are many transformations, physical and chemical, that can occur along the way and in the eyes of the final user of a product its connection to a mine somewhere in the world is far from clear. In this way the understanding and appreciation of mining and of miners can suffer.

It is important to note that after their first use as materials, all metals can be economically recycled at high rates and returned to the same use if needed. Moreover, the percentage of metal demand that is met by recycling is increasing even as the total demand for metals increases. Even non-metal materials (brick, aggregate, gypsum, etc.) are increasingly recovered and reused at the end of the life of structures. There are limits. Not everything can or should be recovered for reuse or recycling and no recycling is 100% efficient. Chemical uses of minerals like phosphate rock and potash are examples of mined products that will never be recovered or re-used.

It is significant in national developmental and global sustainability terms, however, that resources extracted from nature in one country become, after a one-time financial consideration upon exportation, current and future resources in other countries. Inevitably as well, the ability of mining countries to use their mineral endowment for development can be impacted by market access decisions made in consuming countries; restrictions on the use of mineral based products also imply restrictions on the outlook for mining investments. This puts into sharp focus the direct and indirect economic, social and legacy benefits (or costs) of the initial extraction of the resource and the close life cycle interconnections between producers and markets.

Organization of Mining

“Mining” is a very generic word. In examining the challenges of sustainability associated with mining, the nature of the mining will largely determine the type and severity of the impacts as well as the potential to support mere subsistence or contribute to development. In addition, the type of mining will provide clues to the type of societal responses needed to prevent or alleviate the impacts without losing the contributions to sustainable development:

- **Large scale mining:** This is characterised by high capital investment, high investment per employee, dominance of multinational firms, high degree of public ownership, and high operating and managerial competence. These entities receive the greatest attention from civil society and in this paper. They are the actors best placed to make investments that change the developmental dynamics: they have the capacity. Very significantly, they are required to operate to high standards, and their choices are the most likely way that best practices will be introduced into a national mining economy. They also, in the event of an error, have the resources and the incentive to put things right. Those operators are generally public entities.

They are therefore held to greater standards of disclosure on their operations, not only on their financial but also on their social and environmental performance.

- **Small scale industrial mining:** Some of these are substantial operations in their own right and are “small” only in comparison to the operations of the senior mining corporations. The mines can have long operating lives and are operated for profit, not subsistence. Ownership varies greatly from national ownership to family to cooperatives. There are also small scale mines operated by large entities. While there are no firm statistics, there are probably several tens of thousands of small scale mines. Small scale industrial mines can operate profitably on deposits that are not of interest to the big players. Also there are vast numbers of small scale miners that deal with commonplace but essential building blocks of society: sand, gravel, aggregates, clays, etc. While not in the same league as the large scale miners it is appropriate that they be incorporated into mainstream economic activities, expected to conform to the rule of law, and make their own contributions to sustainable development.
- **Artisanal and small scale mining (ASM):** This informal mining activity comprises individuals, families or small cooperatives that often operate in an unregulated fashion. Targets of their interest are high-value materials such as gold and gemstones although not confined to that. In different country contexts, ASM and the informal mining sector can assume a very high political and environmental importance; it often creates a large number of jobs for the poorest people. The informal and often shifting nature of the mining requires, however, treatment different from large and small scale mining characteristic of the formal sector and for this reason is discussed separately.

This diversity of products, scale, ownership and management, type (underground, open cast, placer) poses challenges for governments. The legal and administrative infrastructure must accommodate all this diversity while harnessing it for sustainable national development.

Managing National Mineral Resources for Sustainability

The ambitions and capacities of the different actors mean that there is no one standard to which all miners can be held. It also means that the broader roles of miners vary and their impact on everything from national financial accounts to local wage rates, from occupational health and safety to community health, will differ. It follows that the national plans of different jurisdictions for the management of mineral resource bases must accommodate these realities although every plan will necessarily reflect differing political, cultural and economic conditions.

Not all challenges arise uniquely from mining. There are aspects that indeed relate specifically to the needs or actions of miners but even those – permitting for exploration or licences for mine operations, management of mercury – will reflect the general environment within which a nation administers itself. This is as it should be. Regulations, incentives, investments, management specific to mining should be supportive of and consistent with the broader national intent on issues as diverse as child labour or

national compliance with international conventions and agreements and, of course, the sustainable development of the nation.

This paper focuses on the plans of governments for ensuring that mining contributes to sustainable development. These plans have direct and profound implications for the mining industry, in particular large-scale mining undertaken by the large national and international mining organizations as they are best placed to implement the management systems that serve as the example and benchmark for smaller players in the formal mining sector. And while most of the requirements will be formalized in permits and other agreements, a strong culture of social responsibility in corporations will lead to the best outcomes for all stakeholders.

The national capacities and resources required are enumerated in the following pages. While all are relevant, not all need to be in place or fully developed in order for progress to be made. The world cannot stop until the perfect system is ready; no national jurisdiction in any country currently satisfies all the elements covered. This means that the requirements outlined in this paper can be described as a framework for the systematic pursuit of improvement.

In addition, not all national jurisdictions face the same mix of issues at the same level of intensity. It follows as well that different jurisdictions are at different stages of development and maturity when it comes to the management of mineral resources for national development and poverty alleviation. The important thing is that all the elements needed for these tasks – and how they would work together – are known and understood.

Legal and Policy Environment

Governments require a broad set of policies, laws, regulations and guidelines to manage social and environmental risks and impacts, to maximize social and economic benefits from mining activities, and to enhance development opportunities related to mining investment. In addition, institutional capacity needs to be in place for informed and timely decisions on mining environmental and socio-economic corporate plans, and for ongoing monitoring and enforcement.

A mature modern legislative regime is one that provides clear lines of responsibility and accountability. Such a regime is the foundation of governance and contributes to sustainable development in all aspects of social and economic life. A mining industry that makes the best contribution to national goals will operate in such an environment.

The existence and accessibility of intellectual and institutional capacity to develop, put in place, and give effect to laws and policies is essential. This is not a mining issue but for countries dependent on mining with its dimensions of direct foreign investment, potential for large revenue generation and for large impacts on economic, social and environmental conditions, it assumes a special importance.

It is possible to distinguish between the major elements of the legal and policy environment and those that are specific to mining...but they are all needed. First, the legal and policy foundations for all national development:

Cadastre system and land tenure rules and regulations: This is not driven by the needs of mining but is a national planning and administration necessity. A sound system in which the population can have confidence contributes to social satisfaction, reduced need for recourse to legal action, and supports all manner of developmental activity of which mining is only one.

System of contract law, including arbitration: Of a similar importance to the cadastre system, the existence and operation of contract law enables the continuance and expansion of economic activity. It is a significant consideration in the evaluation of political risk for both domestic and foreign investment.

Informed, transparent and timely decision-making processes: Decision-making processes, in general and for issues specific to mining, will be as consultative as necessary and as quick as is consistent with the need for decisions to be well informed.

Ratification of and adherence to relevant international treaties and conventions: While there are codes and voluntary initiatives relevant to the mining industry (Equator Principles, Global Compact, EITI, etc.) governments set the example and support sustainability when they ratify and implement basic international instruments (Universal Declaration of Human Rights, Declaration on the Rights of Indigenous People) as well as instruments specific to mining (Convention on Safety and Health in Mines).

Financial codes and taxation regimes: Such codes, accounting standards and taxation/royalty regimes will be transparent and as stable as is consistent with the responsibility for keeping them up to date and relevant to the economic and development requirements of the country. They will reflect the specificities of different extractive industries (i.e., oil and gas). (See also sections on mining taxation and management of revenues.)

Community engagement: Engagement with communities establishes and maintains a constructive relationship with affected communities over the life of the project. An effective engagement process allows the community's views, interests and concerns to be heard, understood, and taken into account in project decisions and in the creation of developmental benefits. It also allows the community to better understand mining, its opportunities and challenges. This is true for any development – a highway, a dam, a pulp mill – but can be especially significant for mining where it may be the first or only economic activity in the community other than farming, or an activity that has no prior history in the community.

Policies that favour/support entrepreneurship: The greatest developmental benefits from mining occur when national and local resources – capital and labour – use the presence of a mining activity to gain skills, enter new business areas, and create employment. While success depends on initiatives coming from local business and communities, the potential for growth in the national pool of technical skills and business experience will be nurtured by policies that encourage new endeavours and non-traditional employment. When well done, the contributions from this kind of economic activity are typically larger than from traditional taxation and royalty schemes and, more importantly, it is more relevant to poverty alleviation in the communities and regions where mining is taking place.

From this point onward, the text moves from the necessary general conditions for sustainable development in a national economy to elements that are specific to mining. These mining-specific elements collectively constitute the Policy Framework developed by the members of the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development.

Legal and Policy Environment

A mature modern legislative regime is one that provides clear lines of responsibility and accountability. Such a regime provides the foundation of good governance and contributes to sustainable development in all aspects of social and economic life.

To this end Governments should consider:

The ongoing generation of and access to geological information

The generation of baseline geological, topographical and other information for national land use planning, and making that information available to individuals, communities and other civil society actors with equal access to ensure that consultations between different parties can take place on an equal footing.

Geological information is the basis of all that follows. Governments have the responsibility to know and understand the land mass occupied by the nation. With that understanding citizens can be informed and potential explorers and investors encouraged. In addition, it will allow the government to put into context the data that those explorers and investors will be developing for their own purposes.

The revision and periodic updating of mining codes and standards

Mining codes and standards revised and updated to reflect changing knowledge and best practice. They should deal with all aspects of mining from exploration to closure and post-closure management. The data and reporting requirements by entities should be made explicit in exploration and operating licences so that authorities can make informed decisions.

Mere geographical data without a framework for the conduct of mining will not suffice. The expectations of society, in ways consistent with sustainable development, need to be clearly expressed.

A permitting process that requires:

Mining entities, in preparing their applications for a mining permit, to consult with communities and other stakeholders at all stages of the assessment and planning process and to document the nature and results of their engagement programme in the permit application;

The submission of integrated social, economic and environmental assessments. In addition to a baseline description of current conditions, permit submissions should describe possible risks and impacts of the mining activities together with proposed mitigation or management measures;

The permit submissions to identify and quantify opportunities and propose programmes that lead to the creation of sustainable benefits over the life of the project;

The permit application to be considered complete only when it includes acceptable plans for the eventual closure of the mine and the provision of adequate financial assurance to cover the costs of closure and any ongoing monitoring;

The permit applications, when applicable, to address indigenous peoples, cultural heritage, resettlement, and community safety and security issues;

Mining entities to have a process of consultation that provides affected communities with an opportunity to express their views on project risks and impacts, and be consulted on the development of mitigation measures; and

Completion of the process in a timely, transparent, unambiguous and consistent manner.

Permitting is the point of greatest control for governments and both governments and entities approach the permitting process with this knowledge. Permitting is understood by all stakeholders to be crucial and necessary but what permits cover and how the permitting process advances varies considerably. For mining to make its maximum contribution to sustainable development there will be a number of common elements that will be present in ways compatible with differing national legal systems.

Policies and strategies for artisanal mining: Artisanal and small mining (ASM) is largely a subsistence activity for those engaged in it but it can contribute disproportionately to the environmental and human consequences of mining. This challenge is sufficiently different for it to be treated separately. (See Artisanal and Small Mining)

Financial Benefit Optimization

Governments need to ensure that tax and royalty revenues derived from exploration, mine development and mining reflect the value to society of the resources mined, and are collected and put to work in support of the sustainable development of the nation.

To this end Governments should consider:

The implementation of a revenue generation (taxation and royalties) scheme that:

Optimizes the return from the mining activity and the taxation agreements achieved with foreign and domestic investors in a manner that reflects the different realities they face;

Optimizes the resource levy revenues to society during times of high prices, while minimizing the need for entities to reduce or end production during times of low prices, and supporting a variety of sustainable development objectives; and

Seeks to integrate the mineral sector with other sectors of the economy so as to optimize the contributions of the mineral sector.

Large scale mining projects are long term in nature. They involve large upfront capital expenditures and are subject to significant uncertainties and risks: operational, economic, technological, geological, environmental and political. Most notably, the volatility of commodity prices means that revenue flows may vary widely. Changing circumstances, both global and domestic over the life-cycle of the project, mean that the apparent fairness (or unfairness) of agreements, will be dynamic. The political sensitivity in this area is always present and heightened when the investor is foreign.

Small scale industrial mining as defined for this paper will be part of the formal economy. While the scale of operations and investments will be vastly different, there will be useful revenue streams but also the same price dynamic that will affect revenues as well as the level of acceptance of the taxation regime.

In addition to basic net profit tax on corporations, mine production is subject to a variety of levies. Much depends on the nature of the material being mined but national governments will consider profit-based mining taxes or production-based royalties (see box).

Taxes versus Royalties

If the resource levy is based on profit it is a mining tax. Typically a mining tax will generate lower revenue at the start of a mine but more over the life of the mine. This model is also suited to the use of incentives that support the sorts of extra-fiscal policy goals such as reduction in revenue volatility. (For more, see below: "Management of Revenues") In addition, a mining tax will capture more of the profit of the mine during times of peak prices. However, the reverse will be true during periods of low prices for which there are many examples.

If the resource levy is based on production instead of profit, it is called a royalty. In this model, the revenue stream to governments begins earlier and is more predictable but higher cost mines pay a higher percent of their profits as a royalty when prices are high. In times of low prices, the royalty based on production is payable even if it makes the mine unprofitable. This can become an incentive to reduce or even cease production during such times.

A mining policy that:

Maintains sufficient flexibility to ensure that a balance is achieved between optimizing revenue from mining activities while permitting the mine developers and operators an adequate rate of return on their investment;

Uses national corporate income taxes based on net profits as the common element for large and small scale commercial mining; and

Applies such taxes in the same manner as to non-mining entities within a jurisdiction but with the potential for allowances specific to mining for defined expenditures and/or accelerated deductions to achieve specific public policy aims.

The basic need for a comprehensive and coherent fiscal regime that accommodates the specificities of mining was signaled in the Legal and Policy Environment section. Many of the macro-economic reservations aimed at mining as an economic activity for developing countries can be traced back to how the revenues derived from exploration, development and mining are collected and put to work in support of the sustainable development of the nation.

Using taxation measures that are available to them, governments will want to reduce the volatility of revenue inflows so as to aid economic and fiscal planning. Governments will also want:

- To maximize the productive life of the mine and thus the employment and opportunities for mine-related business development;
- To promote exploration and development of the national mineral resources;
- To reward or off-set company expenditures in social and economic development programs;
- To favour upgrading of resource products within the countries of origin when economic and sustainability justifications exist; and
- To generate financial support for the remediation or management of orphaned or abandoned mines.

Every jurisdiction will determine what best fits its circumstances and needs. There is no template but each of these aspects (and others specific to national situations) will influence national mining regimes.

Such policy goals, especially when consistently and successfully communicated, will assist local understanding and acceptance of the larger national role of mining when revenues are seen to be flowing from a particular region to the capital city

The need for human and intellectual resources to manage the sector such that:

There is adequate governmental capacity to negotiate the financial terms and conditions of mineral development agreements, to administer the tax system and the agreements, to deal with transfer and other pricing issues, and to audit the results;

There is knowledge of how mineral development agreements are developed in other jurisdictions and the degree to which they are serving national objectives. Domestic competence in these matters should be considered a priority and, as necessary, be supplemented with independent third party expertise.

The ability of a country to administer and audit its tax system is essential to obtain the maximum benefit from its tax regime.

The integration of fiscal instruments and policy objectives such that:

All negotiations on mineral development agreements and licenses should take into consideration national policy objectives and how the agreements can support them.

The maximization of mining's potential to contribute to sustainable development is incomplete if the fiscal and tax agreements with investors do not reflect national policy objectives that go beyond revenue generation for the state. The alignment with business development and the development of human capital are particularly relevant.

Addressing the issue of the distribution of benefits by:

Providing open and transparent data on tax and royalty flows and how the benefits have been distributed at the local, regional and national levels. Governments may wish to consider how to benefit from initiatives such as the Extractive Industries Transparency Initiative (EITI); and

Using different mechanisms to maximize the transparency, understanding and acceptance of how the direct financial flows from mining operations are apportioned in ways that are appropriate to their political and legal systems.

It is in the interest of all stakeholders, including governments, that the taxes and royalties from mining are seen to be supporting national, regional and local priorities. While not all the revenue can or should return to the region from which it came, evidence that a portion of that revenue derived from mining is being applied to developmental needs in the region is important for community and domestic regional support for the project. Of particular importance is the relationship between the mining activity and how it supports local and regional development.

These mechanisms can include:

- derogation of certain tax power to regional authorities
- negotiation of percentages of taxation revenues to local and regional government
- tax credits to encourage investment by local entities to provide goods and services to the mining operations or to the communities dependent upon them
- using a portion of the revenues received from mining to support or participate in community health, education, economic and other programs established by the community or the community in partnership with the mining company

Socio-economic Benefit Optimization

The conversion of natural capital into human capital holds the greatest promise for sustainable outcomes from mining activities.

To this end Governments should consider:

The need to integrate community, regional and national issues by:

Integrating mines and mining into the local, regional and national fabrics;

Making socio-economic planning a formal part of the permitting process;

Addressing mining operation effects, interactions or local, regional and national dependencies, in initial documentation and in regular reporting;

Making consultation with affected stakeholders a requirement of the permitting process and at every stage of the mining cycle;

Making planning subject to review and approval for the original permit; and

Making the original permit subject to regular review and periodic revision to reflect new goals and changing conditions.

Revenue generation has traditionally been the understandable focus of government interest in mining. However, a broader consideration of the full economic impact of mining operations suggests that direct revenues, welcome and important as they are, are not a complete measure and sometimes not even the most important measure of the economic and social capital impact of mining.

For all stakeholders, including governments but especially for communities in proximity to mines and mining-related activity, priorities shift in importance as they get closer to the daily life of communities. It is here that the conversion of natural capital into human capital is most relevant and holds the greatest promise for sustainable outcomes. The dynamics of demand created by the mine development and the supply responses require the development and deployment of human and financial resources. There are measurable and significant economic consequences – including tax revenue and encompassing business and employment creation – that are under-reported but can be traced directly to the stimulus provided by mineral development.

Mines have sometimes been divorced from local dynamics with the focus on how the mine contributes to national revenue and little else. If mining is going to be intelligently planned and executed by governments and corporations holding permits, a broader context is essential as mining often

represents opportunities for economic activity that in most cases represents an advance over what existed before.

Mining – exploration, construction, and operation – creates demand for labour, goods and services. Satisfying those demands creates more demands for housing, feeding, educating and caring for those who respond to the initial requirements. This stresses the infrastructure but it is a positive stress when appropriately managed. In addition, there are opportunities – in most cases an urgent need – for skills training and up-grading. The perspective for managing the challenges must extend far beyond the boundary of mine operations if a holistic sustainable outcome is to be achieved.

The Framework conditions enumerated below depend on a matrix of policies, attitudes and behaviours but when they are present, the largest and most important contributions to sustainable development and poverty alleviation are made. It is in this way too that the understanding and acceptance of the mining activity can be maximized.

Making education a national priority by:

In a manner consistent with local and national needs, targeting every level of education from primary to post-graduate levels;

Ensuring that both the physical infrastructure and the human resources to staff and service educational facilities are put in place and up-graded over time through the efforts of all stakeholders, including the permit holder; and

Ensuring that, with government leadership, stakeholders other than the permit holder assume greater responsibility over time so that when closure of the mine approaches the physical and human educational infrastructure can make the post-closure transition with a minimum of disruption.

Mines are often developed in provincial or frontier areas. In such cases, the basic educational infrastructure will probably be less developed than in established urban areas and further stressed by the influx of new populations to work in or service the mine. In addition, technical education – the education that leads to higher wages and portable skills that go beyond mining – for local populations may not be adequate to prepare them for competition from expatriate or labour from more advanced areas of the country. The graduates of educational efforts should, over time, alleviate or eliminate the need for expatriate technical and managerial staff. More generally, the educated, trained and experienced workers from mine and mine support activities become a national resource beyond the life of the mine.

Addressing community health by:

Including health considerations in the baseline socio- economic assessment required by mining entities during the permitting process;

Working with mining entities as well as with communities in the planning and priority setting for health services that the entities may have undertaken to provide; and

Leading with other stakeholders to gradually assume responsibility for this activity from mining entities so that when closure of the mine approaches the physical and human public health infrastructure can make the post-closure transition with a minimum of disruption.

Similar to education but perhaps even more immediate in terms of sustainable development and returns to the community, mines developed in provincial or frontier areas – the most common pattern – are in a position to make significant differences to the availability and quality of health services.

Ensuring high standards for occupational health and safety by:

Ensuring that each company within its jurisdiction accepts corporate responsibility for occupational health and safety through an appropriate set of legal requirements, as well as through governmental monitoring, inspection and enforcement activities;

Ensuring that failures in occupational safety and health performance are effectively dealt with to prevent reoccurrence and are supported by a system of penalties up to and including the revocation of operating permits; and

Requiring entities to provide the education, training, equipment, and adequate system that will reduce hazards and minimize the risk of accidents, injury, and disease and create a safety-conscious environment.

The provision of a healthy and safe workplace is a human right enshrined in key ILO conventions. It is in everyone's best interests, starting with the workers and their families and communities and includes the corporation. The achievement of occupational health and safety is a company responsibility that, when successfully pursued, leads to a more productive, profitable and stable operation: fewer grievances and compensation claims, and lower turnover of staff.

Optimizing employment opportunities at the mine by:

Requiring that socio-economic plans be part of the permitting process and seeking to optimize the employment of host nationals, particularly those from the vicinity of the mine. Depending on national circumstances, educational and other elements will have increasing the national presence in the operation of the mine, including increasing levels of managerial responsibility as an objective.

Employment in the formal mining sector implies two things: the dignity that comes with gainful employment and, in many cases, advancement from “subsistence class” to “working class”. (See also section on ASM.) An appropriately structured mine operation will allow direct and indirect employment that increases the likelihood of educational opportunity for children, advances in gender equality, general improvement in quality of life, and diversity in economic activity. It also increases the tax base for local, regional and national governments.

This sounds too good to be true and in some cases it is. Examination of the specific situations and of the alternatives, however, suggests that there is usually a net gain for society and when there isn’t, it is a failure of the legal environment and the permitting process. The need for remedial action in some cases does not invalidate the general observation that appropriately prepared and executed mining operations raise the standard of living, create social capital and lead to business formation opportunities that could persist in the national economy long after the mine has closed.

Typically, miners earn more than equivalent workers in society. This is a reflection of the value of the products they produce and of the occupational health and safety challenges historically associated with mining. This is addressed later. On the socio-economic front, however, employment in mining or in the service industries upon which the mines depend means regular and superior wages. Those wages are spent in the local economy and, in turn, support the whole range of economic activity in a community and, in diminishing ripples, the national economy.³ The “labour” required by a mine is extensive and important but the supervisory and managerial positions provide more opportunities for the development of human capital. While some of the expertise will be specific to mining, other aspects are transferable to other public and private sector activities and represent an important contribution to the sustainable development of the national economy that goes beyond mining.

Creating business development opportunities by:

Putting in place a supportive legal and fiscal environment so that the socio-economic plan developed by the permit holder and approved by the government includes the promotion of opportunities for local, regional and national supply of goods and services to the mine, the community and the region; and

Promoting new non-mine related industrial and service business opportunities made possible by infrastructure put in place for the mine.

The opportunities presented by the creation of an economic activity where there was none before should equal or greatly exceed the direct financial contributions to governments. In addition, the creation of human capital will inevitably be relevant to a broader economy that needs electricians, plumbers, equipment operators as well as managers of industrial operations.

³ As the reduction of poverty is a requirement for sustainability and social justice, the increase in consumption is a trade-off in this case. Sustainable production and consumption is a global issue outside the scope of this paper although how society manages production and consumption in the context of sustainability clearly has implications for mining.

As noted, a general environment supportive of entrepreneurship needs to exist but needs also to be supplemented by encouragement and understanding by the mine operator. The standards required for mining operations will often mean that existing local firms will increase their level of professionalism or new local entrants will start operations at a level near or equal to international standards. As with employment, these competences, driven by real market needs and nurtured by government policies, represent a positive contribution to the sustainable development of the country that goes far beyond the mine.

Addressing potential security issues by:

Working with entities to address issues that may give rise to security concerns before issuing permits or commencing operations. Governments and entities should consider using the tools and programmes of the socio-economic plan to resolve or reduce the potential for disputes and be guided in their actions by international norms such as those represented by the International Finance Corporation Performance Standards on Social and Environmental Sustainability and the Voluntary Principles on Security and Human Rights; and

Not issuing permits when a deposit to be mined is in an area of active armed conflict. When there is already active development or an operating mine when conflict breaks out, governments and operating entities should act to protect human rights and ensure the safety of miners, their families and communities in accordance with the OECD guidelines. If this does not prove possible, governments may consider removing the mine operation from the dynamics of the conflict by any means possible, including by revoking the mine permit and shutting the mine down.

Security that goes beyond the normal controlled access to a mine site or related to protecting high value material against theft is usually the consequence of unresolved issues. There are a number of circumstances that can make security – at the mine, in the vicinity of the mine, in the surrounding communities – an issue: lingering land claim or land compensation problems, unresolved relationships between a corporate miner and ASM participants, resentments based on actual or perceived favouritism towards one ethnic or linguistic group over another. Sometimes it is the presence of the mine that gives rise to the security issues; sometimes the mine just happens to be in an area where security is an issue. Regardless of the origin of the security risks, all stakeholders have an interest in reducing the risk as much as possible and then managing the remaining risk to the advantage of employees, their families and the community.

The importance of respecting human rights, indigenous peoples, and cultural heritage by:

Ensuring that domestic policies and laws are (at a minimum) consistent with international law and norms. With regard to indigenous peoples, governments and mining entities should respect the spirit and intent of current and future international normative language such as is found in the International Finance Corporation Performance Standards on Social and Environmental

Sustainability; and

Ensuring that high standards of conduct are observed by mining operations in their countries and requiring that mining entities, in their permit applications and day-to-day operations, are knowledgeable of and act in ways consistent with national laws and international laws and norms.

Mining operations and exploration and development projects encounter social issues that are both complex and challenging to both industry and host governments. Under the general rhetoric of human rights, issues such as land acquisition and involuntary resettlement, indigenous peoples, cultural heritage and labour and working conditions need to be managed in a progressive manner. A number of existing instruments provide an excellent starting point for the development of policies and laws or, more expediently, by governments insisting that individual instruments be applied, in whole or in part, by entities within their jurisdiction. These instruments include:

- ILO Conventions
- United Nations Universal Declaration on Human Rights
- United Nations Declaration on the Rights of Indigenous Peoples
- UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage
- Global Reporting Initiative (GRI)
- United Nations Global Compact,
- Voluntary Principles on Security and Human Rights
- Equator Principles
- IFC Performance Standards or similar regional guidelines

Environmental management

The management of the natural resource base within ecosystems is the continuous responsibility of any society seeking to become more sustainable.

To this end Governments should consider...

The management of the natural resource base within ecosystems – the soil, plant, animal, water and air – is the continuous responsibility of any society seeking to become more sustainable. In this context, mineable deposits appear in locations both convenient and inconvenient: close to or distant from human settlement; close to or distant from water abundance or water scarcity; close to or distant from arable lands or ecologically sensitive areas. Mining those deposits will always impact on the resource base to a greater or lesser extent. Active management of the natural resources will avoid impacts where possible (and may mean excluding mining in certain cases), minimize them elsewhere, remediate as necessary and improve when feasible.

...the management of water by:

Having appropriate environmental management standards in place for the use of surface and ground water. These standards would be strictly monitored, and have appropriate penalties should they be compromised;

Requiring that mining entities ensure that the quality and quantity of mine effluent streams discharged to the environment, including storm water, leach pad drainage, process effluents, and mine works drainage, are managed and treated to meet established effluent discharge guideline values;

Requiring that mining entities ensure that water-leaching or percolating waste dumps, tailings storage areas and leach pads have equivalent protection; and

Requiring that mining entities have in place practices and plans that minimize the likelihood of impacts beyond the mining site, particularly potential trans-boundary impacts.

Water is assuming an ever greater importance. The two key parameters are usage (the demand for process water) and quality of the water after use or water not used but impacted by having mining operations in the vicinity. Water use and conservation receives greatest attention in arid regions or where mining competes with irrigation for agriculture. At the same time, high rainfall areas pose additional problems of soil and tailings stability and thus the potential for accelerated erosion and the contamination of vast volumes of water and sediments carried by fast flowing water.

...avoiding and minimizing potential adverse effects to biodiversity by:

Requiring that mining entities submit environmental management programmes and updates for approval, during the permitting process and whenever there are significant process or operational changes during the operating life of the mine;

Identifying, monitoring and addressing potential and actual risks and impacts to biodiversity throughout the mining cycle; and

Requiring that mining entities conduct monitoring on a continuous basis based on national standards and the conditions of the operating permit, compile and submit performance assessments to government and publish regular reports that are readily accessible to the public.

Ecosystems are stressed from many angles. Monoculture agriculture, forestry and urbanization are the most important but mining is another stressor. Whether strip mining of coal (large surface areas) or underground mining (small footprint but large waste rock or tailings impoundments) mining will change the landscape permanently to some degree.

...managing mining wastes by:

Ensuring that structures such as waste dumps and tailing storage facilities are planned, designed, and operated such that geotechnical risks and environmental impacts are appropriately assessed and managed throughout the entire mine cycle and after mine closure;

Requiring that mining entities design, operate and maintain mine waste structures according to internationally recognized standards; and

Requiring that mining entities commission independent expert reviews and report to governments prior to development approval, when changes in design are proposed, and at regular intervals during the operating phase.

Some mining operations will have high utilization and recovery rates. Coal, potash, quarry materials and others will generate relatively small percentages of waste materials (overburden, waste rock, tailings) while others – gold, for instance – will give extremely low utilization rates. All, however, can generate large volumes of material that has no current value but which has been changed (in shape, size, and composition) from what it was before mining. The hazards that result vary greatly from instability (potential for landslides) to pollution of ground water from leaching of newly exposed or disturbed material.

...the development and implementation of an emergency preparedness programme by:

Requiring all mining operations to have an emergency preparedness and response programme prior to commencement of operations and ensuring that the programme be reviewed, tested and updated on a regular basis;

Basing all elements of the emergency preparedness programme on ongoing consultation and cooperation with local and other stakeholders and government;

Ensuring that monitoring of the effectiveness and responsiveness of the emergency preparedness programme is conducted by companies in cooperation with communities and all levels of government;

Ensuring that mine emergency plans are comprehensive and meet current best practice standards, specifically by:

- *Requiring the development of emergency preparedness programmes as part of an environmental impact assessment for any new operation;*
- *Requiring regular review and updating of such programmes;*
- *Requiring consultation and cooperation with local, regional, national and, as appropriate, trans-boundary stakeholders in the development and maintenance of emergency preparedness programmes;*

- *Endorsing and promoting international best practices, such as the APELL process, at national or regional levels to better coordinate emergency preparedness between mining entities, local authorities and local populations; and*
- *Ensuring that appropriate government departments and agencies at the national, regional and local levels are aware of and prepared to cooperate with mining company response actions.*

Emergency Preparedness Program

The identification of all possible hazards and their classification in terms of the likelihood of occurrence and severity of possible outcomes.

The minimization of residual risks through hazard elimination, engineering controls, procedures and education.

The preparation of emergency response plans to ensure official and corporate coordinated and fully-resourced response and control measures can be activated to meet the specific needs of all emergency situations within the mine site, vulnerable communities and transportation corridors.

With the best oversight mechanisms, best management systems and implementation of best practices, there remains the risk of a sudden failure from natural events or human error. For this reason, emergency preparedness planning and practice is essential. The concern might be highest within the boundaries of the mining operation but also extends to wherever supplies for the mine (e.g., acid, explosives) or product from the mine (in rail cars, trucks or barges) travel. Moreover, and regardless of where the event originates, effects may be felt far beyond the mine operations (water sheds, fishing areas) and could include trans-boundary effects.

Emergency preparedness for mine-related events is foremost a corporate management responsibility.

Post-mining Transition

A mining operation which is considered consistent with sustainable development is one whereby planning for closure is present during the entire operation of the mine.

To this end Governments should consider:

Ensuring that closure plans prepared by mining entities are of a high standard and updated on a regular basis by:

Providing legal and regulatory frameworks for closure;

Having the institutional capacity to monitor and enforce its provisions;

Requiring that stakeholders be consulted in the development of closure objectives and plans;

Requiring that a comprehensive closure report and adequate financial assurance be provided before the requisite development and mining permits for a new mine are approved;

Requiring the use of external experts by entities to contribute to the development of closure plans and to validate the risk assessments, studies and activities associated with high risk elements such as tailings dams, waste dumps and acid rock drainage;

Requiring that internationally accepted guidelines and best practices (such as IFC Performance Standards on Social & Environmental Sustainability) be followed;

Requiring the periodic reassessment and independent auditing of closure plans: more frequently for mines with an expected short operating life, less frequently for large operations with economic life expectancies measured in decades; and

Putting in place a framework to encourage progressive rehabilitation in mining areas as soon as the disturbed area is no longer needed for mining. This would reduce future closure liabilities and reverse or minimize future environmental, economic and social impacts.

The products of mines are usually reusable or renewable (through recycling) but the deposits themselves are finite. A mine may sustain operations for 100 years or more but more realistically its economic lifetime will be much less. Complicating factors are the price fluctuations experienced by the products of the mine and, over time, the supply-demand balance for those products. Therefore the amount of time available to prepare for and provide for the closure of the mine is both limited and may be unpredictable.

No mining operation can be considered consistent with sustainable development if planning for closure is not present during the entire operation of the mine. The term "mine closure" covers risk assessments for environmental management over time, community risk assessment, community consultation and planning, program design, monitoring, research, pilot programs, redesign, implementation and post-implementation monitoring and remediation as required.

The development of financial assurance mechanisms for mine closure by:

Ensuring that financial assurance for closure and post-closure expenses is present and adequate to the task and by adopting legislation, regulations and guidelines for financial assurance. These would:

- *Require an adequate level of financial assurance based on realistic estimates to cover the cost of all outstanding work programmes at any time, including premature closure and the conduct of closure programmes by third party contractors in the event that the mine operator is unable or unavailable to complete the work;*

- *Require that each closure plan and its cost estimates be validated or approved by the responsible authorities;*
- *Establish appropriate forms of financial security (bonds, insurance, etc.), including their specific details and conditions;*
- *Require that the financial securities be issued or held only by qualified and approved financial institutions;*
- *Give governments, based on their sole discretion, the right to gain immediate and unencumbered access to the full amount of the financial assurance securities; and*
- *Allow the draw-down or release of security instruments only as each work programme or other requirement is satisfied.*

The presumption with traditional industrial development is that the activity – a steel mill, a paper mill, an assembly plant – will continue forever and there is no tradition or practice of setting aside funds sufficient to remediate the site or help prepare communities for the day of closure. Mining operations, however, are treated differently because of the direct nature of their impact on the environment and because the lifetime of the economic activity of extraction can be given a reasonable approximation from the very beginning. Mine closure is, therefore, a consideration in the initial permitting process. This expectation that a mine must generate the resources for a closure process and post-closure management is a requirement for mining to be considered a contributor to sustainable development.

Accept a leadership role for orphaned and abandoned mines in their jurisdiction by:

Working in partnership with entities that collectively constitute the mining industry to explore options for developing technological solutions (including the reprocessing of mining wastes) or contributing expertise or other resources to help resolve the legacy issue of orphaned or abandoned mines;

Working in partnership with those countries whose economies benefitted from the flow of low-cost industrial inputs that came at least in part from mines that are now orphaned or abandoned that contribute to the resolution or management of abandoned mines;

Using targeted fiscal arrangements to encourage the re-activation of those mines to create economic activity, fund remediation, and provide for post-closure management In cases where such a mine or its wastes have economic potential; and

Seeking recognition by multilateral agencies and organizations that the historical and legal situation of such mines, particularly in developing countries, requires their leadership in managerial, advisory, hortatory and financial forms.

Thousands of years of mining have given rise to tens of thousands of mine “workings” that are abandoned and in many cases such a part of the landscape that they are no longer recognized as former mines. The environmental impacts associated with them were either never great or long since moderated by time to now be inconsequential. That is not always the case with more modern (last ~300 years) mines. There are former mine sites that are large and/or impacting continuously on the environment that are either orphans (ownership has reverted to the state because the previous owners

are unknown or no longer in existence) or abandoned (where the owner is unwilling or unable to take action). The responsibility for managing or remediating falls to the state. This is not a trivial responsibility as there can be risks of death, disease and environmental destruction on a large scale arising from such sites.

At the same time, there are no clear lines of legal responsibility or agreed international instruments (let alone financial assistance) to deal with this legacy issue. The ability to conclude that mining is supportive of sustainable development will be strengthened when there is a meaningful collective response.

Artisanal and Small Mining (ASM)

Artisanal and small scale mining is a complex and diversified sector that includes poor informal individual miners seeking to eke out or supplement a subsistence livelihood, to small-scale formal commercial mining entities that can produce minerals in a responsible way respecting local laws.

In the beginning, all mining was artisanal. Groups that found deposits of flint, native gold and native copper had influence and wealth. The artisanal miners of the day flourished. It was only over time, with growth in demand because of population, trade and technical progress that the nature of mining changed.

In recent centuries the role and nature of artisanal mining has evolved to what it is today: an economic activity largely subsistence in nature and desperately dangerous to the people who work the deposits and disproportionately harmful to the environment. The numbers engaged in ASM are very large – estimated at 20 million directly with another 100 million dependent⁴. ASM may be marginalized economically compared to the formal mining sector but it is by no means marginal in human and environmental terms.

ASM is thus vital but, unlike the large and small scale mines in the formal sector of the economy, there has been reluctance by governments and industry to come to grips with the human and environmental consequences of ASM. The reasons for this vary but include the daunting size of the problem, competing priorities, the lack of a political voice for ASM miners, the fact that ASM usually takes place outside the legal system that governs other mining activities, and the lack of alternatives to ASM that would keep the miners and their families alive and offer at least the prospect of a better future.

All these issues remain but in the last decade the profile of ASM has increased: awareness and recognition of ASM is now present at the highest levels of the international policy arena. This increased awareness has been accompanied by an emerging understanding that when properly harnessed and

⁴ Artisanal and Small-scale Mining and Livelihoods in Africa. Karen Hayes. 2008

addressed holistically, ASM can be a driver for sustainable development.⁵ To this end, initiatives such as Communities and Small-scale Mining Initiative have been successful in uniting stakeholders from governments, civil society and industry to develop collaborative approaches to improving ASM.

Due to its diversity, seasonality, unregulated nature, the trade of minerals through unofficial circuits, and lack of government capacity, the sector still lacks sufficient hard data on the scale of ASM which makes monitoring progress very difficult. ASM presents a wide-range of challenges, with many interrelated causes and effects. Since no one problem can be alleviated in isolation, it is critical that interested actors work in concert with one another to ensure that projects reinforce one another, that all available information is shared, and that any new initiative is responding to an actual need within the ASM community.

ASM is a socioeconomic phenomenon and challenge just as much as it is a mining issue. It therefore requires a multi-stakeholder, multi-sectoral approach that will be slower but will create more sustainable results.

Work is progressing in countries with large ASM populations to regularize the legal status of ASM. There have been many technical assistance projects, pilot projects aimed at improving the lot of children and women in ASM. There is a better sense of what might work and be replicated elsewhere. This modest progress is supported by a growing recognition in industry that claims and permits granted by governments do not protect their investments if a balance is not achieved with the needs of ASM miners. And governments increasingly understand that the mineral endowment of their countries cannot be said to be advancing sustainable development if ASM is not dealt with.

Unlike large and small mining in the formal economy however, the elements of policy and deployment of resources needed to either bring viable parts of ASM into the formal economy or to improve ASM practices remain underdeveloped. The following paragraphs describe the central changes that, when achieved, will bring ASM into a broadened understanding of the mining sector. ASM should become at the very least not a hindrance to sustainable development and, wherever possible, a stepping stone to sustainable economic activities that may or may not involve mining.

To enhance the quality of life of those miners working outside of the legal framework and to enhance their contribution to sustainable development, governments should consider:

Ways of integrating informal ASM activities into the legal system by:

Creating clear legal frameworks and regulatory mechanisms to facilitate the organisation of ASM, access to property rights and ensuing obligations for ASM;

⁵ The 2005 conference on ASM and the Millennium Development Goals; the World Bank's Extractive Industries Review, the Kimberly Process and the 2005 Moscow Declaration, and Annual CASM conferences substantively contributed to an understanding of ASM as a driver for sustainable development.

Providing technical support to build the capacity of government or other bodies tasked with regulating and supporting the sector; and

Developing and replicating formalization strategies on the basis of lessons learned.

A key step toward improving ASM is addressing the legalization and formalization of the sector. Legalization moves the sector out of the murky informal economy, improving the ability of stakeholders to collaboratively develop sustainable approaches to mitigating the harmful aspects of the sector, while catalyzing the positive aspects. Formalization - the process of registering and organizing mining in the field - is a crucial related step. It often requires a multi-stakeholder intervention strategy to improve the incentives for artisanal and small-scale miner to enter the formal economy. While addressing legalization and formulation issues are a critical first step, these changes must be accompanied by a technical assistance and capacity building of the institutions and government bodies tasked with supporting the sector. Without capacity building and technical assistance, the best legal and regulatory frameworks fall short of their intended purpose and potential.

Ways of integrating informal ASM activities into the formal economic system by:

Improving savings in the artisanal mining community, establishing more acceptable forms of financing and encouraging responsible investment;

Strengthening the appropriateness, viability and transparency of policies and systems for collection, management and reinvestment of ASM revenue;

Encouraging initiatives for standards and certification of ASM "fair trade" conflict free minerals to harmonize and grow in scale; and

Encouraging, through the permitting process or at other times, entities to explore ways to collaborate with ASM when ASM is present or can reasonably be anticipated to follow the development of a mine.

ASM creates a vast and complex network of financial relationships between actors in the sector. At the lowest point in the chain, the miners receive only a small proportion of the value of their product (depending on the commodity), income is squandered, and exploitative debt-financing is wide-spread. However, on the basis of the material they produce, many other actors make a living: the porters who haul the ore; the merchants who provide goods in the mines; the traders who handle the minerals; the governments who tax them; and the entities who produce and sell their products containing the metals.

The artisanal minerals trade can be associated with conflict, in some cases fuelling rebel activity and the arms trade. As part of the global minerals trade, ASM is subject to many of the same external forces as the large scale mining sector (i.e. changing demand, price fluctuations, the influence of emerging markets, new standards in consumer expectations, and the need for investment.) However, artisanal miners are less equipped to address these challenges due to lack of land tenure, limited or no financial reserves, inability to access credit, and limited financial skills.

Reducing the social and environmental impacts of ASM by:

Providing technical training to improve productivity and to safeguard the environment, and developing, disseminating and enforcing regulations with a particular emphasis on safeguarding water sources, reducing deforestation, ending or reducing the use of mercury, and improving the management of mercury and other toxic substances when it is not possible to eliminate them, including safe working conditions, access to health care, etc;

Having national programs that provide minimal standards of health and education to ASM workers and their families;

Making a significant and verifiable reduction in the number of children employed in artisanal mining and improvements in the nature and scheduling of their work so as to accommodate educational needs;

Strengthening, monitoring and enforcing laws on child labour in artisanal and small scale mining areas;

Strengthening the role and security of women in ASM; and

Promoting the inclusion of ASM in rural development and job creation policies such that, where desired and realistic, alternative livelihoods are promoted.

Artisanal mining is often both a symptom and consequence of poverty, as well as a route out of poverty. Many artisanal miners start to work in the mines out of desperation and lack of alternatives. For others it is an opportunity to find a subsistence source of income in times of environmental crisis, or on a supplementary or seasonal basis. The potential for ASM to genuinely contribute to poverty alleviation is, however, compromised by poor practices. The rate of conversion of natural capital into social capital in ASM is low. Non-renewable resources are inefficiently managed; the health of the population is compromised by physical hazards, pollution and dangerous materials; children are excluded from education; and the environment is degraded making post-mining livelihoods in the area difficult. Women, who often make up a substantial percentage of the ASM population, are subject to gender discrimination. The attraction of mining can also encourage flight from traditional occupations to the detriment of more sustainable livelihoods.