Mining, Minerals and Sustainable Development

CONCEPTUAL FRAMEWORK AND TOPICS FOR ANALYSIS

A Consultation Document

July 2000

1. Introduction

The Mining, Minerals and Sustainable Development (MMSD) project is an independent process of participatory analysis with the objective of identifying how mining and minerals can best contribute to the global transition to sustainable development. It is designed to be an open and independent process based on consultation with and engagement of stakeholders and leading experts as well as the impartial analysis of existing knowledge, priority issues and possible solutions.

The project has set the ambitious analytical objectives of assessing global mining and minerals use in terms of the transition to sustainable development. We will cover the current contribution - both positive and negative - to economic prosperity, social justice, environmental integrity and accountable decision-making, and the track record of past practice. We will then identify how the services provided by the minerals system can be delivered in accordance with sustainable development in the future.

The list of issues to be addressed is potentially limitless, and a shared conceptual framework is required to help systematise and prioritise specific research tasks. This consultation document outlines the broad themes that the project plans to address. It presents the current thinking of the MMSD team on its analytical priorities and processes. Many of the ideas have been proposed to us for analysis by the variety of stakeholders whom we have begun to engage. **We are now seeking and encouraging specific input and comment on these ideas from all interested parties**.

We begin with a summary of the broad themes we plan to address and the methods we intend to use. A more detailed list of critical issues for work at the global level is then provided to enable more specific comment and to add substance to the broad themes for readers who are interested in particular topics.

2. Major Themes

The analytical agenda is taking a twin-track approach, working at the global and regional levels. At this stage, we are seeking comment on the major issues to be addressed at the global level. The following themes have emerged so far as likely candidates, the list is not exhaustive. For conceptual clarity, we have put the themes under one of the dimensions of sustainable development. Unquestionably, the analysis will reflect the inter-linkages and cross-cutting aspects of most of these themes.

Social

Human Rights, Indigenous People and Ethnic Minorities

What is the contribution that minerals' development can make to the promotion of human rights in the workplace and the local community? Are there examples of good practice that enable traditional, aboriginal, and indigenous communities to assert their culture and interests in the face of minerals development and the globalisation that it brings? What are the legal, economic and political preconditions at the local, national and international levels?

Community Empowerment
What are the critical factors that enable communities to play an effective role in mining developments that affect them so that livelihoods become sustainable, particularly after closure?

Artisinal/Small Scale Mining
A very large number of people depend on small-scale mining as a livelihood. The environmental, health and safety concerns in the sector are of great importance. What are the critical concerns of small-scale miners? How can the relationship between multinational companies and small-scale miners be improved?

Environmental

Waste Disposal
What are the overall environmental impacts of mining wastes? What are the disposal options for waste?

Material Flows
How could potential improvements in eco-efficiency and resource productivity – driven by policy, markets and technology -- affect mining and minerals use in the future? How will projected patterns of consumption affect sustainability?

End-Use
What processes are available for resolving controversial end-uses of minerals, such as coal, lead, uranium, and for improving efficiency in consumption?

Economic

Wealth Generation and Distribution
What is the 'total value added' of minerals developments; how is financial, human and social capital affected by the transformation of natural capital stocks of minerals into economic value? Who wins, who loses and who captures the rents? How should mineral revenue best be managed at national and regulatory levels?

Financial Drivers
How are mineral exploration and development projects financed, and what opportunities or constraints do these financial realities place on a transition to a more sustainable industry? To what extent do current practices in financing represent either barriers to adoption of best practice, or potential incentives to implement it?

Mineral Market Cycles
How can the understanding of mineral cycles be improved to minimise rapid and unexpected shocks to local communities, regional and national governments, and other actors? What techniques are required for managing the cycle in tune with sustainable development?

Other Themes

Design of Implementation Process
A wide variety of tools can be applied by different actors to deal with specific issues in the minerals system: regulatory, market-based, financial, civil etc. In many cases, there is inadequate knowledge of the effectiveness of these instruments and a lack of objective 'good practice' case studies. The task is to identify the key tools that need further analysis and enquiry.

Information and Transparency
What are the critical data needed to make informed decisions on mining, minerals and sustainable development; what information is available; whose responsibility it is to bear the costs of its generation, and where is progress hindered by a lack of reliable data or poor access?

Corporate Responsibility
How can sustainable development become embedded in the culture of mining companies? How far should corporate policies for sustainable development extend to joint venture operations, sub-contractors and the supply chain?

3. Methods of Analysis

1. Baseline Assessment
The baseline assessments will synthesise existing knowledge from a comprehensive literature review and, where necessary, contract new research to establish baseline sustainable development profiles for the mining and minerals sector.

2. Commissioned Research
Research will be commissioned from leading academics, research institutes, consultants and industry experts to cover specific areas of the global research agenda.

3. *Regional Partners*
Certain topics will be of greater importance to specific regions and our regional partners will undertake this analysis.

4. Focused Research Workshops
We plan to convene expert research workshops/task forces on particular topics, which may be contentious and require detailed analysis from a range of different perspectives.

5. Multi-stakeholder Dialogues
We intend to host global dialogues on a limited number of priority issues, which will be of interest to a broad range of different stakeholders.

4. A Compendium of Topics for Understanding the Cycle, the Drivers and Impediments to Change

Defining and narrowing the project's scope is one of the most pressing issues. Our starting point is that the analysis will need to be multi-dimensional, multi-layered and dynamic. Six key dimensions can be identified which mark out the main outlines of the project's scope:

The Value Chain: The project aspires to an integrated analysis of the sustainable development issues along the value chain, encompassing both the mining and the minerals' cycles, production and consumption. Markets for minerals range from the local to the global, with widely differing driving forces and priorities at each stage of the chain. The project will need to focus in on specific aspects of the chain – and dynamics – which are currently poorly understood; for example, the optimal balance between virgin and recycled minerals.

Geography: Minerals are produced and consumed in every part of the world, in very different ecosystems, regulatory frameworks, political and economic conditions and cultural contexts. The Project Strategy stresses the importance placed on a decentralised approach drawing on regional concerns. Decisions are be required on the geographical coverage of the project, since not every region can be covered in the same degree of detail.

Time: Mining moves more material than any other human activity. As a result, its impacts on the landscape and the human environment can be permanent impacts. The scope of the project could therefore address:
a) issues of the past – the legacy of historic mining and minerals activities;
b) impacts of current operations; and/or
c) possible future consequences for sustainable development of different trajectories in minerals production and consumption.

Actors: Mining and minerals use affects numerous social groups and thus creates a wide spectrum of people with a stake in its performance: communities, governments, companies, civil society organisations, workers, universities etc. The distribution of rights, risks, rewards and responsibilities also varies within and among these groups. The project will need to ensure that the differential opportunities and threats generated by minerals' development are adequately reflected.

Minerals: Over 100 different minerals are currently mined, falling into three broad groups: 1/ those produced for local markets (e.g., sand, quarry stone, aggregates); 2/ those produced for regional markets (e.g., coal, limestone); and 3/ those which compete in a truly global market (e.g., metals, diamonds). These minerals are extracted through a variety of means by an array of actors ranging from artisans to global corporations. While many of the sustainable development issues may be generic, choices need to be made on which minerals to focus on and which to exclude.

Sustainable Development: Finally, sustainable development itself involves specific dimensions – social, economic, environmental and political – which need to be integrated. Each of these dimensions comprises many distinct issues. Our work to date has highlighted the contested nature of sustainable development – and its status in the eyes of many as a 'soft option' that does not adequately address issues of rights, justice and security. There are clear differences of emphasis on the weight given to different components of sustainable development; for example, the livelihoods focus of the South and the stress on environmental damage in the North. One of the main tasks of the project will be to articulate how the interpretation of sustainable development differs according to context. The conceptual framework developed needs to reflect this diversity.

Bearing in mind these six dimensions, we provide a long, but as yet incomplete, list of the topics that we believe could concern the MMSD project.

We have divided the mineral lifecycle into three main stages: the primary mining stage, the intermediate stage of smelting, refining, processing and fabrication and the final stage of end-use consumption, recycling and disposal. At each stage, we have attempted to identify the critical sustainable development issues and questions in terms of social justice, environmental integrity and economic prosperity. In the fourth section below, we have raised questions about the key drivers and tools for change.

I. Mining

I.1 Social

Culture

- How does mining affect culture, particularly by bringing global community into direct contact with local cultures? How do mining and exploration companies act as agents of cultural transmission?
- Do communities have adequate control over their cultural identity?
- Do attempts to ensure local economic benefits could make these problems worse?
- How to deal with cultural issues of isolation, family separation etc.?
- What are the community impacts of mine closure:
    - Past and present practice
    - What can be done to improve the situation?
- How should communities be compensated for resettlement?
- How can social dependency on mining be reduced or limited?

Human rights

- Should investors stay out of regions where human rights are not respected?
- Can mining investment play a positive role?
- What is the appropriate balance between satisfying the national government and respecting local communities?
- How can multi-stakeholder approaches or dialogue with communities overcome the lack of freedom of expression?

Mining and social/political stability

- How does mining contribute to conflicts (eg 'Diamond Wars')?
- What are the effects of national economic/political dependency on mining?
- Can mining be a force for stability?

Health

- What is the balance between positive impacts (e.g. access to better food, health services) and negative impacts (mining related sicknesses; alcohol; diseases such as HIV/AIDS)?
- How can a more transparent and honest process of risk assessment and risk reduction for miners and the surrounding communities be achieved?
- What are the health impacts in terms of occupational health and the spread of diseases as community dispersed after closure?
- Does the health infrastructure survive after closure?

Gender

- How does mining affect/disturb traditional gender roles and what tensions/opportunities does this create?

Community Empowerment

- What mechanisms are effective to promote human rights in the workplace and in the community?
- How can communities' capacities for self-determination be strengthened?
- How to use mining income to invest in sustainable livelihoods for local communities?

I.2 Environmental

- How to deal with the quantity and quality of wastes produced during operation:

- Ocean *disposal:* Do we understand the science well enough? (eg. physical behaviour of disposal and effects on marine ecosystems – case studies, successes and failures)?
- River *disposal:* What are the effects on aquatic ecosystems and fluvial morphology, availability of alternatives, regulatory attitudes and case studies?
- *Land Disposal:* What are the technologies to reduce tailings moisture content, different disposal options: surface deposit or underground backfill?
- *Stability*: What are the main types of stability problems, managing stability concerns at new operations and unstable old waste sites. Case studies – technical and management /stewardship issues?
- *Chemical stability* - ARD and other leachate generation, mitigation measures
- *Material Mixing:* What is the feasibility of combining waste rock and tailings, research done…?

- *What* is the global state of environmental planning and operating for closure and rehabilitation, and what are the technologies/practices available?
- *Who* takes responsibility for abandoned sites?
- *To* what level is the mining industry involved with deforestation?
- *To* what extent environmental standards are negotiable?
- *How* can a balance between attractive environmental regulations and environmental conservation?

Energy Use in mining

- What are the main sources and impacts of energy (electrical, petroleum products, etc.) for mining?
- How is energy use distributed through the mining cycle?
- How sensitive are total mining costs to energy costs?
- Are there alternative energy sources and options for conservation that should be considered?

Material Flows

- Is there a "sustainable" rate of production of minerals?
- How serious is the finite supply of minerals as an environmental issue, both at the level of the individual mine and globally?

I.3 Economic

- What are the political stability factors affecting the capacity of a country to capture revenues?
- What are the national costs and benefits of mining?
- How to balance competing interests in access to land between:
  - companies seeking security of ownership for project finance
  - communities who may not share the view of land as a commodity and may have established use without legal title or lack control over sub-surface rights
  - community vs. individual compensation; relocation; land valuation
- local and national governments weighing up 'general good' vs. interests of a few landowners
- How can/should 'Go' or 'No Go' zones be identified? Will 'Go' areas always be in poor communities/regions?
- How to estimate and discount closure costs at the time of investment decision?
- How to deal with unanticipated closure caused by abrupt economic changes?

- How to provide financial assurance via closure cost accruals (e.g. accounting practices/cash vs. book value)? How to develop ongoing closure planning (bonds or guarantee)?
- How to ensure long-term financial assurance instruments and maintenance?
- How can bilateral/multilateral schemes or trade agreements enhance growth and respect development needs?
- What share of the exploration work should the government undertake?
- How can mining sustain its contribution to the economy?
- How important is mineral depletion in the context of sustainability? When should mining be prioritised over conservation?

II. Smelting, Refining and Processing and Fabrication

II.1 Social

- What are the employment, health and safety priorities?
- What are the community and occupational health impacts?

II.2 Environmental

- What is the energy and pollution intensity of refining and processing methods and what mechanisms are being developed for improvement?
- What are the flows of materials generated by mineral processing and product fabrication?
- What will be the impact of technological innovation?

II.3 Economic

- What are the implications of processing in different countries for sustainable development (trade, certification, benefit sharing)?
- How will trade and investment liberalisation movements affect the mining industry structure?
- Can greater economies of scale lead to increased supply to the detriment of conservation?
- Does commodity price volatility act as a deterrent to sustainability?
- What conditions are necessary for a country to progress to later stages of mineral processing?
- How can revenues from smelting, refining, processing and fabrication be managed to enhance sustainable growth? How can welfare be measured?
- How can a country fully benefit from the total revenues generated by mining without exposing the company to financial risk (currency convertibility, repatriation of profit, etc.)?

III. End-Use Consumption, Recycling and Disposal

III.1 Social

- What are the priority health risks/hazards (e.g. copper plumbing, aluminium in deodorant)? Compared to what?
- How do minerals and metals improve quality of life/meet needs?
- For which mineral needs are there non-mineral substitutes? How do we choose between minerals and their substitutes?
- Can higher rates of reuse, remanufacture, recycling of materials reduce the need for newly mined products? To what extent?

III.2 Environmental

- What are the dispersed and controlled uses of minerals? What are the implications of growing concentrations of minerals in the environment?
- What is the appropriate balance between newly mined minerals, conservation and recycling?
- What constitutes over-consumption of minerals?
- What initiatives are there to increase recycling and decrease consumption and how successful are they?
- What disposal methods are used? (e.g. for lead batteries)

III.3 Economic

- How do trade restrictions on minerals affect sustainable development?
- Are there other potential stocks/sources of minerals? (e.g. should central banks sell their gold stocks?)
- Are these decisions for the consuming countries to make unilaterally, or do producing countries have a voice in these decisions?
- What would be the economic/environmental/social effects in the developing world of a decline in use/prices of minerals?
- How can the terms under which materials have access to markets better reflect the goals of sustainable development?
- How do restrictions in trade of used minerals/recycled materials impact on sustainable development (e.g. Basle Convention)?

IV. Drivers and Tools for Sustainable Development

IV.1 Policy & Legislation

- How can policy-making become more transparent and participatory, particularly for cross-border issues and in the application of the precautionary principle?

<u>Social and Environmental Regulations</u>

- Can regulations be better designed and enforced to ensure sustainable development?
- How can regulation better control of "free riders"?
- How to remove "perverse subsidies" and introduce positive incentives?
- How can integrated regional planning best be carried out to assess and manage the secondary social, economic and environmental impacts of new mining operations?
- How can occupational health standards be monitored and implemented?

<u>Rent Capture and Distribution</u>

- What are effective mechanisms for the distribution of rent and managing variable revenue streams?
- What working models of best practice are there for efficient and equitable capture and distribution of mineral rents between host countries, local communities and investors?
- How do you reward long-term mining according to sustainable development criteria?
- How much of the take goes to the local community; what is the balance between central government promises vs. local reality? What are effective and equitable negotiating mechanisms?

<u>Capacity</u>

- How to strengthen government capacity to administer and enforce the regulations?
- How to build capacity through training (technical and regulatory skills)?
- How to provide sufficient funding to institute proper regulatory controls?

Economic Structure and Macroeconomic policy

- How to deal with export fluctuations?
- Stabilisation funds?

IV. 2 Technology

Technological Innovation

- What are the major developments in mining, environmental and process technologies and equipment design?
- How can research and technological innovation be accelerated to deliver solutions to today's problems without generating new risks?
- How can cleaner technologies be best diffused globally?
- How can sustainable development principles be included in the development of new technologies?

IV.3 Finance

- How significant are community, environmental and political factors as a source of investment risk? What are examples of projects that did not get built?
- Does lending in regions with limited capacity to manage environmental/community /cultural factors entail special responsibilities?
- What is the role of the public lending sector (World Bank, other multi-lateral development banks and export credit agencies)?
- How do innovations in the portfolio markets (e.g. Socially Responsible and Ethical Investment) affect sources of finance for mining?
- How should private sector sources of finance be reacting to these factors?
- What are the limits on lending institutions as 'regulators'?
- How far will financial pressures, risk management and trans-national liability become drivers of sustainable development?
- How does scale and ownership affect the performance of different mining actors, in particular the artisanal sector and the various "junior" players?

IV.4 Governance & Capacity

Inclusive decision making

- How can relevant stakeholder participation in decision-making be improved locally, nationally and globally and lead to effective partnerships?

Industry

- How can sustainable development become embedded in the culture of mining companies?
- How far should corporate policies for sustainable development extend to joint venture operations, subcontractors and the supply chain?
- How can global benchmarks for environmental management be set to ensure consistency? How can corporations develop the capacity to implement sustainable development practices?

Civil Society

- How can the capacity of civil society be strengthened to engage in decisions that affect their interests?
- What is the role of academia and universities in this?

Communities

- How can the capacity of local government be strengthened to manage abrupt change or to spend, manage and invest money?
- What are the critical factors that enable communities to play an effective role in mining developments so that livelihoods become sustainable, particularly after closure?
- Who controls community sponsored foundations and what rules work?

IV.5 Markets

Certification/branding

- Product is fungible and producers anonymous
- High level of 'disconnect' between production and consumption
- Limited opportunity for 'branding'
- Are there new opportunities to capture the value in identification of origins?

Globalisation of trade and investment

- Where are the critical gaps in the governance of international trade and investment, which hamper progress towards sustainable development?
- What market-based instruments offer opportunities for promoting more efficient and sustainable trade and investment?
- To what extent are the current global mechanisms for marketing minerals barriers to greater sustainability or opportunities to achieve it?

IV. 6 Information

Reliable Information for Transparency

- Trust requires access to reliable information
- Science requires access to reliable information
- Trusting information and /or good science require understanding of how this information is produced
- In most of the world, even very basic information ("What is in this water?") is not gathered, or not gathered through systems which are trusted
- Or there is no right or access to it
- Transparency: how can all actors be made more accountable for their decisions in order to reduce opportunities for corruption and other negative practices?

5. A Question of Depth

Not all of the issues suggested above will be dealt with in the same depth. The extent of treatment of each topic will depend on stakeholder feedback, the project team's recommendations and the decisions of the project's Assurance Group. Five main options are available:

1. MMSD carries out relatively general analysis, reviewing existing knowledge and drawing on the expertise of other organisations working on overlapping topics

2. MMSD commissions more in-depth research

3. MMSD requests one of the regional partners to undertake the analysis

4. MMSD convenes expert research workshops/task forces

5. MMSD hosts global dialogues on a limited number of priority issues

The project would welcome feedback on which issues to deal with in what way.