II. MINING

The strong demand growth for mined commodities is increasingly driven by emerging economies, while mineral and metal intensity of OECD countries is projected to continue to decrease.

In the past century, the extraction of construction minerals has increased by a factor of 34 and the extraction of ores/industrial minerals increased by a factor of 27, while biomass extraction grew by 3.6 times. Overall, mining operations are likely to increase their ecological footprint due to continuing strong global demand for mined commodities.
Mining and mining support services can contribute significantly to a country’s value added. While many countries (e.g. Equatorial Guinea, Libyan Arab Jamahiriya, Angola) depend on crude oil and petroleum, mining of minerals and metals represents large proportions of the value-added in countries such as Botswana, Mauritania, Mongolia, Papua New Guinea and Chile.

Mongolia’s mining sector extracting mainly coal, copper, molybdenum, fluor spar, tin, tungsten, and gold has grown significantly since the late 1990s due to an influx of Russian, Chinese and Canadian mining operations. Due to large diamond reserves, Botswana’s mining sector is an important source of government revenue and the government maintains a 50 per cent ownership of the largest national mining company, Debswana. Discovery of uranium reserves and concerns over exhaustion of the diamond reserves led the government to support international mining companies’ prospecting for diamonds, gold, uranium, copper, and even oil in the country.

The link between mineral extraction and material use on the one hand and economic growth on the other can be attenuated in three ways:

1. **Structural effect**: Structural changes move the focus in economies from the primary and secondary sector towards the tertiary (service) sector.

2. **Technology effect**: An increasing number of applications use more material efficient technologies.

3. **Trade effect**: The outsourcing of material intensive production stages to other world regions (e.g. emerging and developing countries) will increase.

The technology effect is the only one with unambiguous consequences for dematerialization at the global level.
The case of Sierra Leone highlights the impact of conflict (civil war) on mining operations, which shows in a sharp drop of mining’s contribution to value added in 2001. With the official declaration to end the fighting in 2002 the mining industry started again slowly on a path of recovery. During the civil war (1991 to 2002), a declining economy paired with degrading infrastructure led to a breakdown of the formal economy at the turn of the millennium. During the 21st century mining has had an increasing effect on the value added in several countries (e.g. Lao People’s Democratic Republic, Mauritania and Papua New Guinea).
Increasing demand for minerals means increased exploration, increasing exploitation of reserves and an increased rate of mineral depletion in various regions.

The distribution of metallic mineral reserves varies considerably, but in all cases developing countries possess more than half of global reserves of high-volume metals. They are especially dominant in the case of copper, which has enjoyed buoyant demand growth over the past decade and a half.

The comparison between Africa’s current global share of mineral production and its share of global reserves reveals the potential opportunities for growth of the extractive industries, especially for mining manganese, gold and aluminium. The African region shows the potential to become the first-ranking producer for manganese and also to become an important region for aluminium production.

Effective management and productive investment of resource revenues are critical to sustainable development. If instead countries use mineral revenues for unsustainable increases in consumption or for unproductive investment, growth is unlikely to prove sustainable.

Evidence suggests that greater decentralization, accompanied by necessary improvements in local government capacity, would enhance the impacts of mining projects.

— Kathryn McPhail
Author of the article “Sustainable Development in the Mining and Minerals Sector: The Case for Partnership at Local, National and Global Levels”
The economic impacts of mineral depletion can be represented as the fall in the financial value of a territory’s mineral resources due to current extraction rates.

Countries such as Chile have operated copper mines in an economically sustainable manner for many years. Together with increasingly diversified economies, this means depletion of natural resources may have a lesser impact than in countries which are strongly dependent on natural resources and forego strategies of diversification to address resource depletion.

The growing volume of metallic minerals production in developing countries poses challenges, especially to those countries with weak capacity to: (i) manage resource revenues effectively for sustainable development, and (ii) minimize adverse social and environmental impacts of mining activities. For example, implementing effective waste management of sedimentation, acid drainage and metals deposition is key to address the environmental issues associated with mining. Furthermore, on the social dimension, intensified mining and unregulated distribution of mining concessions may contribute or lead to displacement of (indigenous) communities, to conflict, to competition with other land use options and to inequitable revenue distribution from mining operations (e.g. limited trickle down of revenues from national to local government).
The Johannesburg Plan of Implementation stresses the need to enhance the contribution of mining, minerals and metals to sustainable development. It calls for enhanced participation of stakeholders (including local and indigenous communities and women) in order to promote sustainability, transparency and accountability throughout the complete life-cycle of mining operations, including rehabilitation after closure.

Informed participation in decision making about mining operations is related to human development indicators like educational attainment. In some countries whose economies are heavily dependent on mineral, oil and/or gas production, those indicators are very low, pointing to social vulnerability, including to any adverse impacts of mining activities. The populations in mining areas in Papua New Guinea, the Philippines, and least-developed countries in sub-Saharan Africa (Mozambique and Angola) are among the most vulnerable.22

Example: Central African Republic — The effects of mine closures on communities

NAIROBI, 25 September 2009 (IRIN) — Rising unemployment following the closure of diamond and gold mines in southwestern Central African Republic (CAR), due to the global financial crisis, left many families in increasing poverty and triggered a nutrition crisis, according to Médecins Sans Frontières (MSF).

“In Boda and Nola... it is difficult to find patients only suffering from malnutrition, as many of them arrive suffering from other diseases and their condition is very severe,” MSF’s Clara Delacre said. “There are many cases of malaria, diarrhoea, tuberculosis or AIDS, which further complicates children’s already delicate condition,” she added. The situation has been aggravated by poor cassava-based diets and difficult access to health facilities.

Source: United Nations Office for the Coordination of Humanitarian Affairs — Integrated Regional Information Networks (IRIN), 2009 23
Approximately 10 per cent of active mines and 20 per cent of exploratory sites are located in areas of high conservation value, while nearly 30 per cent of active mines are located in water-stressed areas.

Mining concessions tend to cover smaller areas than logging concessions. Although the actual mining activity may only cover a few square kilometres, exploration activities may spread everywhere within the limits of the concession and the establishment of a support infrastructure extends well beyond the concession area. The map below shows that active mines and exploratory sites are sometimes in areas of high conservation value. Clusters of mining activity occur in the boreal forests and arctic landscapes of North America, the northern coastal and Andean regions of South America, and northeastern and southwestern Australia.

The increasing consumption of resources (mostly energy and water) needed to extract metals as well as the pollution generated by the extraction process are main constraints to sustainability of mining operations.

Overall the location of nearly one third of all active mines is in water-stressed areas and, of these mines, about two thirds are found in highly stressed areas where water scarcity is particularly acute (i.e., supplies of less than 1,000 cubic meters of water per person per year).

Water is becoming a key strategic issue for the mining industry worldwide. Not only does demand for water to be used in the mining sector compete with other water uses; local populations near or downstream of mining sites fear the impact on water quality.