

MINING KEYS FOR UNDERSTANDING

Mining is a problem, and as such should be treated

The concept of “sustainability” is increasingly being emptied of any content, particularly by those who carry out basically unsustainable activities. Among them, mention needs to be made of an activity which is – by definition – unsustainable: mining. It can be argued that mining is necessary to provide people with a number of goods, but it can certainly not be argued that it can ever be sustainable, being as it is based on the extraction of non-renewable resources.

In spite of that, mining corporations are trying very hard to convince the public that they are “sustainable.” With that aim in mind, the World Business Council for Sustainable Development – which represents many of the most destructive corporations in the world – contracted the International Institute for Environment and Development – which describes itself as a non-profit organization – to carry out “an independent two-year project of research and consultation seeking to understand how the mining and minerals sector can contribute to the global transition to sustainable development.” The project has of course the necessary catchword “sustainable”: the “Mining, Minerals and Sustainable Development Project.”

That project had, of course, a political aim and was part of the corporate lobbying activity for the inclusion of the absurd concept of “sustainable mining” in the official report of the World Summit on Sustainable Development. In spite of the vocal opposition of anti-mining campaigners during the WSSD process, mining corporations were successful and mining was officially declared – as if by magic – as “sustainable.”

However, in the real world, to say that mining is unsustainable is really an understatement. Its impacts go far beyond what people normally understand as unsustainable. Mining is responsible for the loss of livelihoods of millions of people; it is at the root of numerous civil wars, dictatorships and foreign armed interventions; it is responsible for widespread human right abuses; it is responsible for poisoning people and the environment; it is one of the major direct and underlying causes of deforestation and forest degradation. Those and many other impacts attached to mining are described in detail in several articles included in this book.

It is true that humanity needs a certain amount of minerals to satisfy some of its – basic or otherwise – needs. It is however equally true to say that over consumption by one part of humanity is destroying the livelihoods and environments of the other humanity at the receiving end of mining.

Because of its impacts, mining is one of those activities that needs to be strictly controlled at all stages, from prospection and exploitation to transportation, processing and consumption. In many cases, strict control will simply mean prohibition. To pretend that mining corporations will control themselves is being more than naive: it’s an absurdity. Even government control is insufficient, given the economic and political power that mining corporations have proven to have over them. Society as a whole must be empowered to participate directly in such control.

But above all, peoples living in mineral-rich areas should have the capacity to take fully-informed decisions on whether mining is to be allowed or not in their territories. In case they agree, they should be empowered to decide on how this activity will be carried out, in order to ensure environmental conservation and social justice.

In spite of all its claims regarding “sustainability,” mining is a major problem, and as such should be treated. (WRM Bulletin N° 71, June 2003).

To understand mining: Starting from the beginning

Mining is the series of activities referring to the discovery and extraction of minerals lying under the surface of the earth. Minerals can be metal *Mining. Social and Environmental Impacts* 15 (such as gold and copper) or non-metal (such as coal, asbestos and gravel). Metals are mixed with many other elements, but occasionally large quantities of certain metals can be found concentrated in a relatively small area – the deposit – from which one or more metals can be mined with financial benefit. The impacts of mining are related to mining itself, to the elimination of the residues from the mine, to the transportation of the mineral and to its processing, which frequently involves or produces hazardous substances.

Mines vary in size, from small operations producing less than 100 tonnes per day, to large mines moving hundreds of thousands of tonnes. The method of exploitation used to mine specific mineral deposits depends on the type, size and depth of the mineral deposit and the economic and financial aspects of the undertaking.

Until the middle of the twentieth century, underground mining was the method most commonly used to extract large deposits. Following the Second World War, technological progress and the development of larger and more powerful machinery such as bulldozers, levellers, power shovels and trucks, made it possible to move enormous quantities of material, promoting the exploitation of opencast mines. However, underground mines still exist such as the Witwatersrand gold mines in South Africa – the deepest in the world – or the El Teniente mine in Chile – the largest underground mine in the world – or Olympic Dam in Australia. An underground mine is reached by a shaft or a decline spiral, leading to the galleries and production levels that are interconnected by raises and winzes used to transport the mineral and workers. Drills and explosives are used to break up the ore – the mixture of minerals from which one or more metals can be extracted – underground. Generally, this type of mining has less impact on the environment than opencast mines. There is less disturbance of the ground’s surface, but all the same, it can have effects on the water by contaminating it with acids and metals and by intercepting aquifers. The workers are exposed to more hazardous situations than those working in opencast mines, due to the risk of collapse, poor air quality and underground explosions. Progressively, companies have abandoned this method due to a problem of profitability, although minerals such as coal, nickel, zinc or lead are still usually mined underground.

Presently, over 60% of the materials mined in the world are extracted by the opencast method, causing devastation of the ecosystem where they are operating (deforestation, contamination and alteration of the water, destruction of habitats). Within this type of

mining we may distinguish, among others, open cast mines (usually for hard rock metals), quarries (for industrial building materials such as sand, granite, slate, marble, gravel, clay, etc.), and leach mining (the application of chemical products to filter and separate the metal from the rest of the minerals).

Opencast mines look like a series of terraces arranged in great deep wide pits in the middle of a desolated and stark landscape, lacking any living resources. The operation usually starts with removal of the vegetation and the soil, followed by extensive dynamiting and removal of the rocks and materials above the ore until the deposit is reached, which is again dynamited to obtain smaller pieces. The new technologies, enabling better performance in the speed of extraction and processing of the minerals, increase environmental problems, as the waste materials do not normally revert to restoring the site.

Quarries are surface mines, very similar to open cast mines, as the end result of their exploitation is also a desolated landscape with deep trenches between wide steps. The aggression to the environment that this type of mining generates is more serious due to its proximity to urban zones, as the reduction of transportation costs is sought to make the quarries more profitable. This proximity causes further environmental problems, because the excavation sites, already lacking vegetation, end up by becoming urban waste dumps, in addition to affecting surface and groundwater near them.

In leach mining, chemicals are used (such as sulphuric acid in the case of copper or a solution of cyanide and sodium in the case of gold) to dissolve (leach) the metals in question from the mineral containing them, obtaining a very high rate of recovery. In situ leaching involves boring the intact rock with drills and adding the solvent, whereas the very frequent type of heap leaching is done on heaps of crushed minerals. The chemical solutions used not only release the desired metals but also mobilize other heavy metals such as cadmium, thus contaminating surface and groundwater.

Even though the environmental impacts of mining vary according to the type of mineral and the mine, this is intrinsically an unsustainable activity, as it implies the exploitation of a non-renewable resource by means of destructive or contaminating methods, such as crushing, grinding, washing and classifying minerals, refining and casting. Mining is presently doubly destructive both due to its large scale and to technology, which has increased its productive capacity. (WRM Bulletin N° 71, June 2003).

Mining: More a curse than a blessing

There is now compelling evidence that mining severely limits a nation's ability to sustain economic growth (even within the narrow definitions usually adhered to by nation states). This is a surprising "discovery" for those who think that "riches" in the ground are unfailingly translated into money in the bank. But for those who adopt an anti-colonialist analysis of capital accumulation, the fundamental reason for the discrepancy is not hard to find. Zaire, Bolivia and Sierra Leone are not merely "poor" – they have been ruthlessly impoverished over hundreds of years. Much of the crippling "foreign debt" carried by the world's "poorest" nations is actually interest supposedly owed on capital which has never been invested in people self-

development at all. Instead, it has gone to building mines, dams, mills, power and processing plants in order to transform “natural” capital – not only iron, copper, bauxite, diamonds, but water, land and air – into exportable value.

People have extracted minerals from the earth since ancient times. Babylonians, Assyrians, and Byzantines mined for copper and lead thousands of years ago in what is today southern Jordan, for example. Since the Industrial Revolution, however, minerals have been extracted and used in much larger quantities. In recent times, this trend has accelerated greatly: in 1999, some 9.6 billion tonnes of marketable minerals were dug out of the earth, nearly twice as much as in 1970. This figure accounts for minerals that finally reach markets, but does not include the wastes generated in producing these minerals – the unused portion of the ore (the rock or earth that contains minerals), or the earth moved to reach the ore, which is known as overburden. If these categories were included in the total amount of materials mined each year, the figure would be considerably larger.

Industrial countries consume more than two thirds of the annual production of the nine major minerals. The United States, Canada, Australia, Japan, and Western Europe, with 15 percent of the world’s population, together consume most of the metals produced each year: about 61 percent of all aluminum, 60 percent of lead, 59 percent of copper, and 49 percent of steel. On a per capita basis, the different levels of consumption are especially marked: the average US citizen uses 22 kilograms of aluminum a year, the average Indian uses 2 kilograms, and the average African uses just 0.7 kilograms.

However, local communities and tribal peoples from resource-rich countries are the most affected by the detrimental environmental, cultural, social and health effects of mining exploration and exploitation activities. Urged by macroeconomic policies pushed by international credit and commercial institutions, many impoverished countries embrace mining as a “staple” activity to generate much needed foreign exchange. There are cases where at least 40% of exports hinge on a single mineral product, as is the case with the copper in Zambia, diamonds in Botswana, Central African Republic, Gambia, Liberia, and Sierra Leone, aluminium in Guinea and Suriname, iron ore in Mauritania. Though these are rather old data (from 1994), they illustrate a still prevailing trend. Twelve of the world’s 25 most mineral-dependent states – most of them concentrated in sub-Saharan Africa – are classified by the World Bank as “highly-indebted poor countries” – the most troubled category of states.

The imposed process of market deregulation and liberalisation has led to privatisation and tax exemptions which have benefited foreign mining corporations. On the other hand, according to a United Nations report, the more that southern countries rely on exporting minerals, the worse their standard of living is likely to be. Higher levels of mineral dependence are strongly correlated with higher poverty and child malnutrition and mortality rates. They are also associated with income inequality, low spending levels on health care, low enrolment rates in primary and secondary schools, and low rates of adult literacy, as well as higher vulnerability to economic shocks. Recent academic studies reveal that overall living standards in mineral dependent states tend to suffer from unusually high rates of corruption, authoritarian government, government ineffectiveness, military spending, and civil war.

With the exception of mercury, asbestos and lead – specifically targeted for their environmental toxicity – the output of major metals has been increasing in an exponential fashion which has virtually nothing to do with satisfying basic human needs but much with the corporations' sheer and unquenchable thirst for profit. There has been a lot of movement within the mining industry in the last years. Mining companies have streamlined their operations as well as gone into mergers and acquisitions to maintain, consolidate, strengthen and expand mining transnationals' global reach of operation. A growing concentration of investment has been in the search for gold and diamonds, which are attractive for their profitability rather than their usefulness.

Although the international mining scenario includes a relatively big number of companies, only a few – getting increasing larger through mergers – seem to dominate the scenario. Most of them originate from a handful of countries, among which the most important are Canada, the United States, the United Kingdom and Australia. Well known companies from those countries include Rio Tinto, Barrick Gold Corporation, Freeport MacMoran, BHP-Billiton, Newmont, Placer Dome and many other. However, other internationally smaller actors may be extremely important at the local level and examples are also provided. Regardless of their international importance they all have two things in common: they are extremely profitable and extremely damaging.

On the other side, mining can be very lucrative for the companies, but not for the local communities in areas where mineral resources are extensive. As the more easily accessible mineral deposits are worked out, a hunger for new cheap sources drives the industry into intensified exploration increasingly into indigenous territories. Communities who have been previously dependent on the renewable natural resources, suffer immediate losses as a result of large-scale mining activities. They see their livelihoods undermined, their social organizations disrupted and their cultures transformed. Cash compensations, if paid, cannot restore these losses and the dark legacy of mining continues even after a mine is abandoned. Lost jobs and livelihoods in agriculture, fisheries and small-scale mining often heavily outnumber the mining jobs on offer. Local people often also lack the skills to benefit from anything but the shortest term and lowest paid jobs available.

Despite the promise of wealth that mineral development holds, in reality, the presence of mineral wealth can even hold back national and local development. According to a 1999 study from Arborvitae (IUCN, WWF), southern countries “rich in mineral resources tend to have slower rates of economic growth, lower levels of social welfare and more highly skewed income distributions than non-mineral developing countries. In fact, the superior resources base of the mineral economies has been more a curse than a blessing.”

The promotion of large-scale mining thus entrenches policies, institutions and mind-sets that visualise “development” as a top-down enterprise to be imposed on local communities and environments – the very antithesis of an environmentally friendly approach focused on fulfilling the economic, social and cultural needs of people and future generations. (WRM Bulletin N° 71, June 2003).

Environmental and social impacts of mining

Mining is a short-term activity with long-term effects. There can be no doubt that when it takes place in forest zones, it is a factor of degradation. It is calculated that, together with oil prospecting, mining is threatening 38% of the last stretches of the world's primary forests.

Mining activities are carried out in various stages, each of them involving specific environmental impacts. Broadly speaking, these stages are: deposit prospecting and exploration, mine development and preparation, mine exploitation, and treatment of the minerals obtained at the respective installations with the aim of obtaining marketable products.

During the prospecting phase, among other activities having an impact on the environment are the preparation of routes of access, topographic and geological mapping, establishment of camps and auxiliary facilities, geophysical works, hydro-geological research, opening up of reconnaissance trenches and pits, taking of samples.

During the exploitation phase, the impacts depend on the method used. In forest zones, the mere deforestation of the land with the consequent elimination of vegetation – greater in the case of opencast mines – has short, medium and long-term impacts. Deforestation not only affects the habitat of hundreds of endemic species (many doomed to extinction), but also the maintenance of a constant flow of water from the forests towards other ecosystems and urban centres. Deforestation of primary forests causes a rapid and fluid runoff of rainwater, increasing flooding in rainy periods because the soil cannot contain the water as it does when covered by forest.

In addition to the area disturbed by the excavation, the damage caused by mines on the surface due to the consequent erosion and silting (sedimentation of the watercourse beds) is made more serious due to heaps of rock residues lacking economic value (known as tailings), that usually form great mounds, sometimes larger than the area given over to excavation.

The enormous consumption of water required by mining activities generally reduces the water table around the site drying up wells and springs. Water usually ends up being contaminated by the acid drainage, that is, exposure to air and water of the acids formed in certain types of ore – particularly sulphuric acids – as a result of mining activities, which in turn react with other exposed minerals. A self-perpetuated dumping of acid toxic material is generated that can go on for hundreds or even thousands of years. Furthermore, the small particulates of heavy metals that with time separate from the waste, are disseminated by the wind, landing on the soil and in the beds of watercourses and slowly integrating the tissues of living organisms, such as fish.

Hazardous chemicals used in the various stages of metal processing, such as cyanide, concentrated acids and alkaline compounds, although supposedly controlled, usually end up, one way or another, in the drainage system. The alteration and contamination of the water cycle has very serious side effects that affect surrounding ecosystems – especially more so in forests – and people.

Air pollution can be caused by the dust generated by mining activities, a serious cause of illnesses, generally in the form of respiratory troubles in people and asphyxia of plants and trees. Furthermore, usually, a release of gases and toxic vapour takes place: sulphur dioxide – responsible for acid rain – is produced because of metal treatment, and carbon dioxide and methane – two of the main greenhouse effect gases causing climate change – are also released, due to the burning of fossil fuels and the creation of artificial lakes for the hydroelectric dams, built to provide energy for the casting ovens and refineries.

Additionally, mining activities consume enormous quantities of wood for their construction – in the case of underground mines – and as a source of energy for mines with charcoal-fuelled casting ovens. Also, when carried out in remote zones, mining activities imply major works such as road building (opening access to the forests), ports, mining villages, the deviation of rivers, construction of dams and energy generating plants.

The deafening sound of the machinery used in mining and the blasting cannot be considered as minor impacts either because they create conditions that may become unbearable for the local populations and the forest wildlife.

It is argued that mining is vital for industrialization, because it provides raw material and sources of energy. However, the present disproportionate concentration of investment on gold and diamond seeking, marginal for industrial production, refute the sector's social justification for its activities. In 2001, 82% of the gold refined found its way to the jewellery market and it is worth remembering that to make a gold ring, the average amount of rock waste generated in a mine is over 3 tonnes. In the United States, the Pegasus Gold company caused the Spirit Mountain in Montana to disappear, replacing what had been a sacred tribal place by an opencast gold mine. Over the next 1,000 years, the site will continue to distil acid into the region's watershed.

Throughout history, the various gold rushes have brought death and devastation to the local populations. From the Sioux of the Black Hills, to the Aborigines around Bendigo in Australia, the history of gold is tainted with blood; and today Amazonian tribes, like the Yanomami and Macuxi, the Galamsey of West Africa, and the Igorot of the Philippines, are similarly endangered.

Mining comes along with its promise of wealth and jobs, but millions are those throughout the whole world who can testify to the high social costs that it brings with it: appropriation of the land belonging to the local communities, impacts on health, alteration of social relationships, destruction of forms of community subsistence and life, social disintegration, radical and abrupt changes in regional cultures, displacement of other present and/or future local economic activities. All this is added to the hazardous and unhealthy working conditions of this type of activity.

It may be held that many of the affected communities have given their consent. However, it is hard to speak of previous, genuine informed consent, as they do not have the opportunity to fully understand what is waiting for them when they are asked to place their signature on the dotted line at the foot of a contract. For this reason,

mechanisms to enable indigenous and local communities to effectively participate in decision-making processes are called for, together with legislation enabling them to reject this type of undertaking in their territories.

If there are people who want to wear gold anyway, or use it to fill cavities, or for micro-circuitry in computers and cell phones, that is all well and good but as someone proposed, take it from recycled sources. Of the 125,000 tonnes of gold extracted from the ground, more than 35,000 tonnes lie in the vaults of central reserve banks. The US Federal Reserve holds 8,145 tonnes of gold, approximately 6% of all the gold ever mined. What would be better than recycling it from the bank vaults! (WRM Bulletin N° 71, June 2003).

The impacts of mining on women

While mining has negative impacts on all those who live in the mining communities in general and those who are affected by the mining operations, there are distinct impacts and added burdens on women.

The differentiated impacts can be begun to be understood in concrete situations, such as that faced by a Dayak woman affected by a mine owned by the company PT-IMK in Indonesia.

“Mrs. Satar had a field as large as 10 to 15 hectares on the community’s traditional land. Upon this land, she could harvest enough produce for one year, in fact sometimes more. With the introduction of the mining into her community, she lost all but one hectare of her land to the mining company. Consequently, she had to buy approximately 3 sacks of rice per month at a cost of Rp39,000 per sack (price at January 1998). In addition, the mining company’s operations polluted the river, which could no longer be used to meet household needs, and no longer produced fish. Previously, Satar had cooked fresh fish each day for her family. Now, as a result of the pollution, she has to buy salted fish. If there is enough money, she purchases 2 kilos of salted fish a month at Rp15,000 per kilo. To obtain bathing and drinking water, Satar must walk a long way to a water source that is not affected by the company’s tailings. Satar’s livelihood is further threatened by the loss of her two water buffalos, found dead at the edge of the contaminated river.”

It is also necessary to understand that companies usually enter into negotiations only with men, excluding women also from the royalties or compensation payments. They even have little or no control over and access to any of the benefits of mining developments, especially money and employment. Thus, women are deprived of their traditional means of occupation and become more dependent on men, who are more likely to be able to access and control these benefits.

Large-scale mining entails the replacement of subsistence economies which have nurtured generations of communities and Indigenous Peoples with a cash-based economy. The new market-based economy implies a significant erosion or destruction of traditional values and customs which have been crucial in sustaining community, tribal, clan and family solidarity and unity. In such process, women become marginalised since their traditional roles as food gatherers, water providers, caregivers and nurturers are very much affected. Economic visibility depends on working

in the public sphere and unpaid work in the home or community is categorised as “unproductive, unoccupied and economically inactive.”

Additionally, the environmental destruction caused by large-scale mining has also decreased the productivity of the fields and poisoned wildfoods, marine life, animals. Many women are pushed to enter into the informal economy to find additional sources of income.

Whilst large-scale mining has limited scope for women’s employment, the small-scale sector absorbs women as contract or bonded labour under highly exploitative conditions. In India, for example, women’s wages are always less than that of men, safety standards are nonexistent, paid holidays are not allowed even during pregnancy or childbirth, work equipment is not provided, and there are no toilets or facilities available. Unemployed women living in mining communities eke out their livelihood by scavenging on the tailings and waste dumps, often illegally, and suffer from the constant harassment of company guards, local Mafia and the police. They are exposed to the physical and sexual exploitation of the mine-owners, contractors and miners and are at the mercy of local traders when selling their ores. In addition, women work with toxic, hazardous substances and suffer from several occupational illnesses including respiratory and reproductive problems, silicosis, tuberculosis, leukemia, and arthritis.

Alcohol abuse, drug addiction, prostitution, gambling, incest, and infidelity are increasing in many mining communities. These have worsened cases of family violence against women, active and often brutal discrimination in the workplace that is often sanctioned or ignored by judicial and political institutions. Even men-led workers’ organizations usually do not raise cases of human rights violations against women. The orientation of discussions between these organisations and mining companies is directed towards economic issues, such as wage increases, subsidies and so on.

In sum mining – be it small or large-scale – is resulting in a large number of specific impacts on women, who are losing out in almost all aspects related to the development of this activity. The wealth generated by mining further pushes women into poverty, dispossession and social exclusion. (WRM Bulletin N° 71, June 2003).