

MINING

ADDING UP THE COSTS OF A HOLE IN THE GROUND

Less than one percent of the world's land is used for mineral extraction – a tiny amount compared to agriculture. But mining has a disproportionate effect on the environment.

With a rising demand for metals, minerals and fossil fuels the mining sector is booming. This involves big changes for the landscape and for nature. In the last 10 years, the output of iron ore has gone up by 180 percent, cobalt by 165 percent, and coal by 44 percent. China's mining sector grew by one third between 2005 and 2010 alone.

In the United States, one person consumes 17 tonnes of metal, minerals and fossil fuels per year – that makes 1,343 tonnes in a lifetime. For every tonne of ore, 3 tonnes of soil

and rock have to be removed. Refining the ore produces toxic waste. Current high commodity prices make it profitable to operate, or to reactivate, mines with low ore content. The global commodity boom has effects that cannot be ignored.

Opening a new mine involves clearing large areas of land: for the mine itself, spoil-heaps and tailings, infrastructure such as road and rail connections, processing facilities and workers' accommodation. Extraction is increasingly taking place in ecologically sensitive or virgin areas such as the Arctic and the rainforests of Latin America and Central Africa. In countries with insecure land titles, mining may result in the eviction of local inhabitants. According to John Ruggie, the United Nations Special Representative for Business and Human Rights, more complaints are made about the mining and oil sector than any other branch of the economy.

Open-cast mining is of particular concern because it claims vast expanses of land. Some 300 hectares of forest are destroyed every year at the Rio Trombetas bauxite mine in Brazil. In Canada, tar-sand extraction has wrecked 15 million hectares; this area cannot be put to any other use for decades to come. In Colombia, Cerejon is the largest coal mine in the world: it covers an area of 690 square kilometres, bigger than Chicago in the United States or Merseyside in the UK, and almost the size of Hamburg in Germany.

Mining can irreversibly change the landscape. The most extreme form is known as "mountaintop removal". In the Appalachians, in the eastern USA, the "overburden" is blasted away to expose the underlying seams. The loose rock is removed by huge excavators and dumped in nearby valleys. Between 1970 and 2008, more than 500 summits lost up to 350 metres in height in this way. Over 5,700 square kilometres of land have so far been transformed.

Shifting rock around on a large scale ruins cultivable land. At a large open-cast coal mine in Jharkhand, India, the topsoil was removed so it could be replaced later when the site was restored. But a study found that it had lost its fertility after 6 years in storage. The work of microorganisms had been disrupted; wind erosion and leaching dominated. Restoring soil fertility when a mine closes is one of the largest problems open-cast mining faces worldwide.

A fall in the water table that usually accompanies mining has negative consequences for the surrounding soils and farms. In the Lausitz, a lignite-producing area in eastern Germany, the water table has sunk by 50–100 metres. The farmland and nature reserves around the open pits have to be watered from deep boreholes. In the Ruhr, a densely pop-

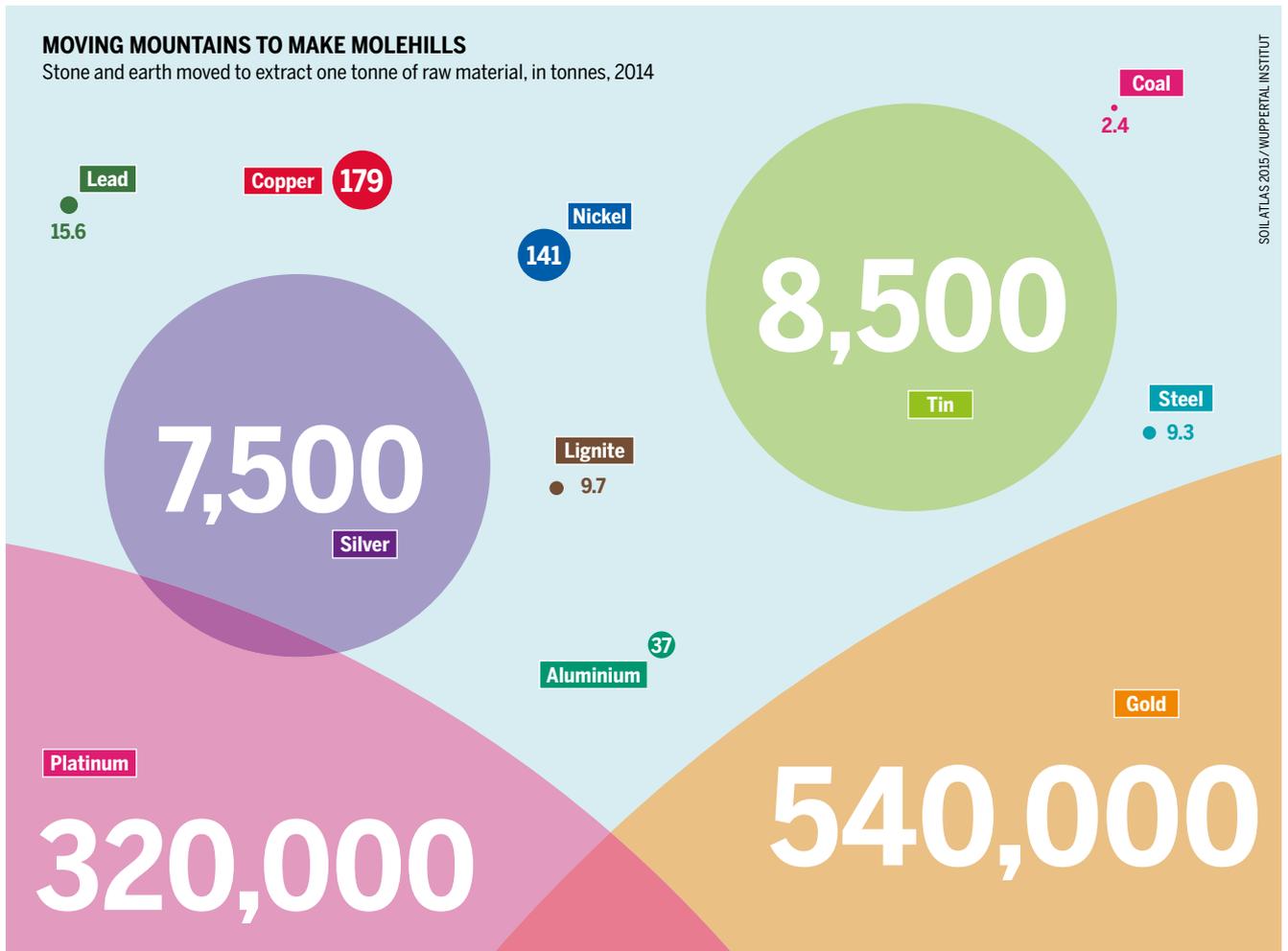


Miners often come into conflict with local people, who see their lives disrupted and their livelihoods disappear

MOVING MOUNTAINS TO MAKE MOLEHILLS

Stone and earth moved to extract one tonne of raw material, in tonnes, 2014

SOIL ATLAS 2015 / WUPPERTAL INSTITUT



Getting at raw materials means moving lots of rock – especially for the metals needed to make electronic devices

ulated former coal-mining area in western Germany, the water table has to be kept artificially low to prevent the area from being transformed into a network of lakes. Such pumping is a long-term cost that must be borne long after the end of mining.

To extract the raw material from its parent rock, the ore is treated with chemicals: sulphuric acid to extract copper, cyanide for gold, and sodium hydroxide for aluminium. The resulting toxic waste usually ends up in storage reservoirs which can be huge. The Kidd Creek mine, in Ontario, Canada, is one of the world's largest metal mines; silver, copper, cadmium, indium and zinc have been mined there since 1966. When it closes in 2023, some 130 million tonnes of mostly toxic tailings will remain. Legally, the mining companies are responsible for dealing with the waste. But they often close or go bankrupt when extraction ends, leaving the cleanup to governments and taxpayers.

A leak in a tailings reservoir may result in the contamination of the surrounding soil and water. In the worst case, the

Digging up coal is a booming business in Indonesia. Mining concessions cover huge areas of land

reservoir overflows or a dyke breaks. That happened in 2000, after several days of heavy rain near Baia Mare in Romania. Some 100,000 cubic metres of water and sludge containing cyanide and heavy metals flowed into the River Tisza. From there it poured into the Danube, killing fish and polluting floodplains and farmland downstream. The long-term costs of this environmental disaster had to be borne by nature and by the people affected. ●

