

Deadly Brazil dam collapse raises fears of environmental woes

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Experts say the real long-term effects of the collapse of a dam at a mine near the Brazilian town of Brumadinho may not be evident for years

A week after a dam storing mining waste collapsed in southeast Brazil, the human cost is clear, with 110 killed and 238 missing, presumed dead, but the environmental impact is still being evaluated.

Authorities fear the mineral-laced slurry released by the collapse could eventually pollute the Sao Francisco River, the second-longest in Brazil, which hosts various species of fish and has many towns on its banks.

Daily tests carried out by Brazil's national water agency ANA in the Paraopeba tributary, muddied along 200 kilometers (120 miles) by the dam burst, show the presence of metals in the water have spiked to unhealthy levels.

Residents along the riverbanks have already said fish they relied on for food were floating to the surface, dead.

"Most of us here are very rural, riverside people, so we use the Paraopeba River to feed ourselves. It gives us fish, we use it to water our plants, and now we can't do this anymore, so many people have been affected by the dam breaking," one local, Leda de Oliveira, 31, told AFP.

Worst industrial disaster

The latest ANA results showed iron, magnesium and aluminum at worrying levels.

It added that, while trace levels of lead and mercury had initially spiked, they had since fallen to normal counts. Arsenic—another impurity often found in iron ore waste—was not a problem, according to the tests.



The Paraopeba River, now muddied with mining waste following the collapse of a dam, feeds into Brazil's second-longest river, the Sao Francisco

But those measured just water quality, and not the way the elements were being absorbed in sediment, food chains and the general ecosystem.

Experts say the real long-term effects of the dam break at the mine, located near the town of Brumadinho and owned by Brazilian mining giant Vale, may not be evident for years.

"Right now there are many unknowns—how toxic is the waste? How mobile are the toxins? Will the waste move again? It is only when these things are known that we will really know how bad this will be," an expert in landslides, Professor David Petley at Britain's University of

Sheffield, told AFP.

Immediate action, "very expensive if done properly," was needed to contain the pollution, he said, adding: "There is a lot of waste in the river. There is a risk that this now moves downstream in floods, or that toxins that it releases might move."

While Brumadinho is now considered Brazil's worst-ever [industrial accident](#), given its high likely final death toll, a similar mining dam collapse three years earlier in the same region, near the town of Mariana, remains the country's worst environmental disaster. Its effects are still being measured today.

The dam near Mariana was part of a facility jointly owned by Vale. Nineteen people were killed. Pollution extended for 650 kilometers (400 miles) along a river, to the Atlantic Ocean.



Communities living along the muddied Paraopeba river said dead fish were floating to the surface

The 60 million tons of waste it released were more than four times greater than the 13 million tons held back by the Brumadinho dam. Whole ecosystems affected by the Mariana sludge were killed off.

Both disasters resulted from ruptures of tailings dams—reservoirs of detritus left over from the process of extracting iron ore. Such dams are the cheapest ways to store [mining waste](#), but also the riskiest, as the two successive disasters showed.

Petley said it was to be hoped that measures to contain pollution were better now, but added that both disasters were "scandalous failures."

'Recklessness'

Vale started decommissioning its tailings dams in Brazil after the 2015 Mariana disaster, and has now accelerated the process for its remaining 10 dams.

But for Brumadinho, where many inhabitants worked at Vale, that process proved tragically slow.



The tailings dam that collapsed in Brazil contained mining waste—the cheapest but riskiest way of storing such detritus

Almost all of the dead and missing were workers at the mine, many buried by the sludge as they were having lunch in the facility's on-site cafeteria.

Many residents accuse the mining giant of putting profits over lives. Graffiti saying "Vale, murderer" has been scrawled on several walls in Brumadinho, and in mud at Vale's headquarters in Rio de Janeiro.

"We are all shaken. This should never have happened. There was a lot of recklessness. Today all of Brumadinho is in mourning," said Gustavo Franca, a 25-year-old real estate agent who lost many friends.

Vale paid dearly for Mariana. It and its partner in the joint venture, Anglo-Australian miner BHP, forked out \$6 billion in compensation and fines. But, while 20 executives were charged, none ever went to trial and to date no one was convicted.

Authorities have frozen \$3 billion of Vale's assets to pay for damages from the latest disaster. Lawsuits are bound to follow.

It has also already lost around 20 percent of its value on the stock market this week.

For the mining company, the world's third-biggest, the blows are harsh. But with 2017 revenues of \$34 billion yielding profits of \$5.5 billion, Vale will survive.



The search goes on to recover the dozens of bodies still buried in the mineral-laced mud following the collapse of a dam in Brazil



The full environmental impact of the disastrous collapse of a dam in Brazil will not be known for years

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