## ECUADOR'S FORGOTTEN VOLCANO The Eruption of Reventador

Ecuador, one of the countries with the largest number of active volcanoes in the world, awoke on Sunday 3 November to a volcanic emergency. Since not enough funds are available to monitor all volcanoes, the Geophysical Institute of the National Polytechnic School—the body in charge of such surveillance—had not been paying too much attention to Reventador volcano, located 95 Km East of Quito, in the province of Napo, which had lain dormant for 26 years. Such was not the case that morning, though, as violent explosions flung gases, pyroclastic flows and large amounts of ash that reached an altitude of 16 Km.

Residents of nearby communities in Napo and Sucumbíos provinces, frightened by the magnitude of the eruption, fled the area. "On Sunday we left in a hurry as soon as we saw that the mountain was starting to spit fire," said a cattleman from the Chaco, the area nearest the volcano. The lava flows followed the course of Maker River, on the volcano's slopes, and caused several landslides that cut off the main highway between Quito and Lago Agrio, the capital of Sucumbíos. Easterly winds blowing in the direction of Quito covered everything in their path—fields, rivers, houses, cattle, reservoirs—with dense ash. The population of Oyacachi, one of the most severely affected towns, reported that by 11 in the morning darkness was almost total. The ash reached Quito by 1:30 in the afternoon, wrapping the city in a grey cloud that made it almost impossible to breathe.


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That very evening, the President of Ecuador decreed a state of emergency in the three most affected provinces—Pichincha, Napo and Sucumbíos. Schools were closed for several days, as was Quito Airport. On Monday, ordinary weekday activities in both the public and private sectors did not recommence as usual, since air pollution was still too severe. The amount of ash suspended in the air reached health-risk proportions: 10,000 particles per cm3, well above the 400 particles/cm3 considered acceptable. According to the Geophysical Institute, a million tons of ash fell, three times the amount ejected by Pichincha volcano in 1999, the last significant eruption to hit the country.

Fortunately, by Tuesday rain began to clear the air, lowering the risk of respiratory, dermatological or ocular ailments. Municipal, provincial and national authorities moved quickly to assess the situation of the most affected communities and launch the relief actions needed. The United Nations System activated its emergency group, UNETE, and organized an evaluation mission, in collaboration with the national authorities, that toured the most affected areas on Wednesday 6.

In the initial hours of the emergency, the most urgent tasks were supplying the population with protective masks, drinking water, and essential drugs. But although the ash and sulfur caused considerable alarm, the most significant damage was to agriculture and water supply systems, especially in rural communities that get their water from fairly basic and unprotected facilities. In general, housing and public infrastructure suffered little. Power cuts persisted over several days in many towns and villages.

**Health and drinking water, the key priorities**

No deaths or injuries were reported as a direct result of the eruption. Some shelters had to be set up for a very small number of evacuees, less than 100, since most inhabitants refused to abandon their homes and cattle while others moved into the homes of relatives and friends.

Health infrastructure continued to function, although in many cases without recourse to electricity or drinking water for several days. Rainfall in the first few days helped to contain respiratory disease morbidity, but the risk reappeared as soon as it stopped raining, making it necessary to engage in epidemiological surveillance. Pichincha Provincial Council sent out 11 mobile health units to care for the potentially affected in rural communities.

The ash affected many of the water-supply systems, particularly in rural areas where water sources are exposed to the elements. In the first hours of the emergency, many communities consumed water taken from nearby rivers without

any kind of treatment. In the following days, water trucks brought potable water. However, the eruption underscored the extreme vulnerability of these systems, and the need to protect water sources, reservoirs, and distribution systems. It also became apparent that communities need to be trained in the use of chlorine for water treatment. It was only in the larger towns (Quito, Cayambe, Pedro Moncayo, El Quiché) that problems were minimal, largely due to the preventive measures put into place after previous eruptions. One outstanding example was the work carried out by the Quito Metropolitan District water company, which after the Pichincha eruption in 1999 invested significant resources to cover and safeguard the water-supply system, protecting nearly two million people from the consequences of consuming contaminated water.

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**Severe damage to crops and the cattle industry**

The ash affected many farms, wiping out short-cycle crops, flowers and legumes, as well as the pastures that feed the cattle, the main source of income for many of these communities. The immediate impact will be a decrease in family income and reduced food security. Milk production fell significantly, alarming the many farmers and farm-workers who depend on this activity and prompting them to call on the government to provide economic support in a crisis that could last for months.

**Coordination: still a long way to go**

Ecuador lived through this emergency in the midst of a political transition. The first round of Presidential elections had been held on 20 October, but the absence of a clear winner meant that the second and definitive round would not be held until 24 November. This affected government agencies' ability to coordinate relief efforts. The United Nations' evaluation states that local-level coordination was very mixed, with some local governments providing outstanding leadership and coordination, as in Pedro Moncayo, Cayambe and Oyacachi, while major deficiencies were detected on the part of the central authorities and the National Civil Defence System. UNETE recommended the design of a comprehensive cooperation matrix that would assign responsibilities before, during and after future disasters of such magnitude, and provide the resources needed for prevention, mitigation, preparedness, response, and rehabilitation activities.

Ecuador confronts a wide spectrum of natural or man-made hazards and vulnerability to them is high, increasing the risk to the population, particularly the poor and marginalized. While this article was being written, a munitions store in a fort in Riobamba exploded, killing several, injuring scores and causing great panic. At present, three of Ecuador's volcanoes remain highly active—Reventador, Tungurahua and Guagua-Pichincha—and many others may reawaken without much advance notice. On top of all this, the El Niño phenomenon may wreak havoc in early 2003. Such scenarios cry out for a solid response system based on effective coordination of the many agencies involved. The new Government will have to confront this challenge.

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